

A M C G R A W - H I L L P U B L I C A T I O N

Chemical Week



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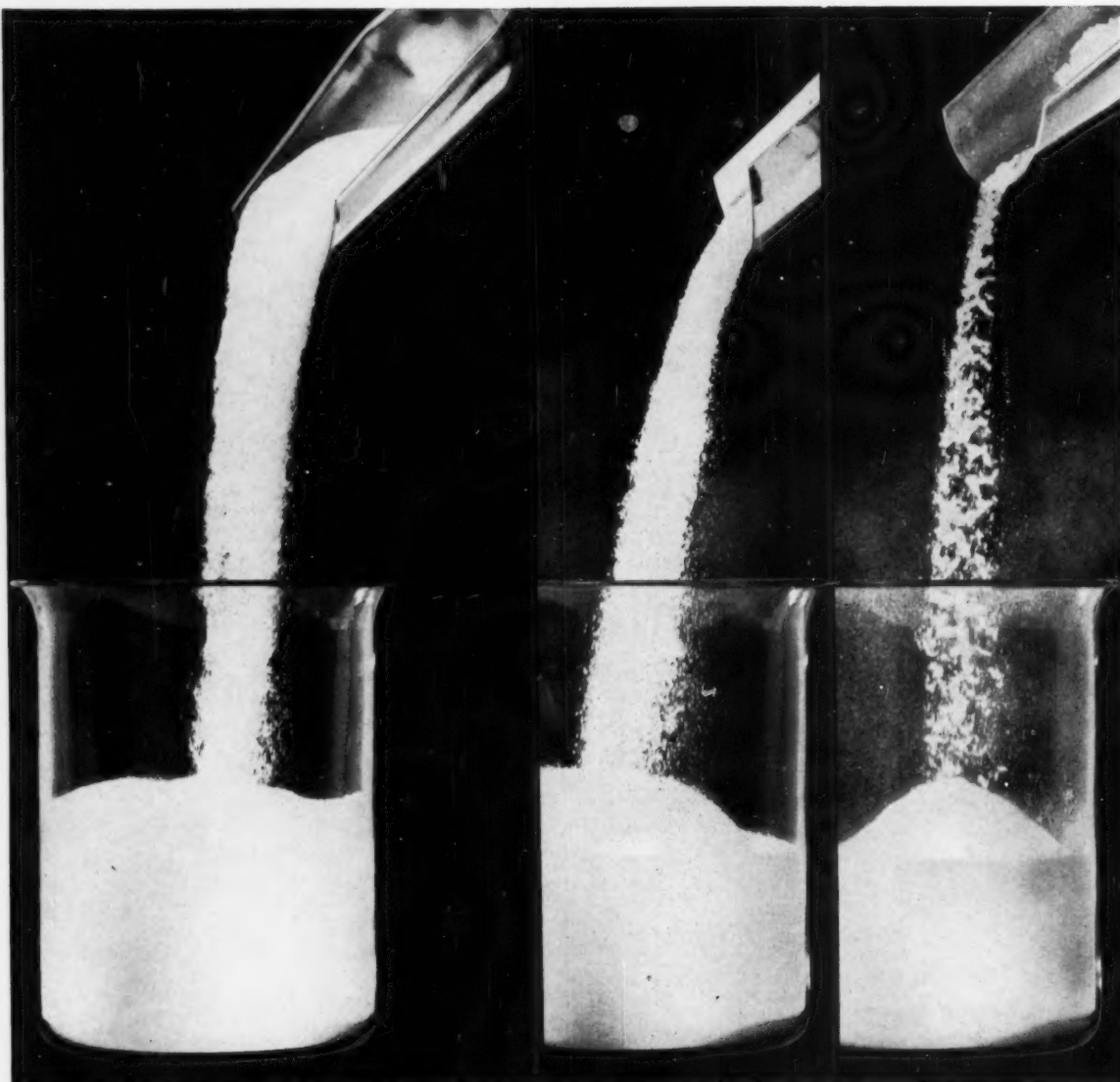
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October 10, 1959

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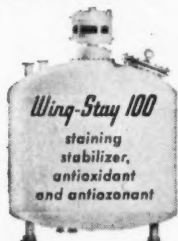
NOW—1 rubber chemical does the work of 3

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TOP OF THE WEEK

OCTOBER 10, 1959

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NOW, with two pieces of your own full removable reduce storage space 80%

One of the costly problems in packaging chemicals in light-gauge, full removable head drums is the great amount of storage space necessary to house the empty containers until ready for use. Now, through the perfection of a unique system, 25 to 40 drums can be stored in the same space previously required for only one drum. 2,000 of these drums can be shipped in a forty-foot boxcar.

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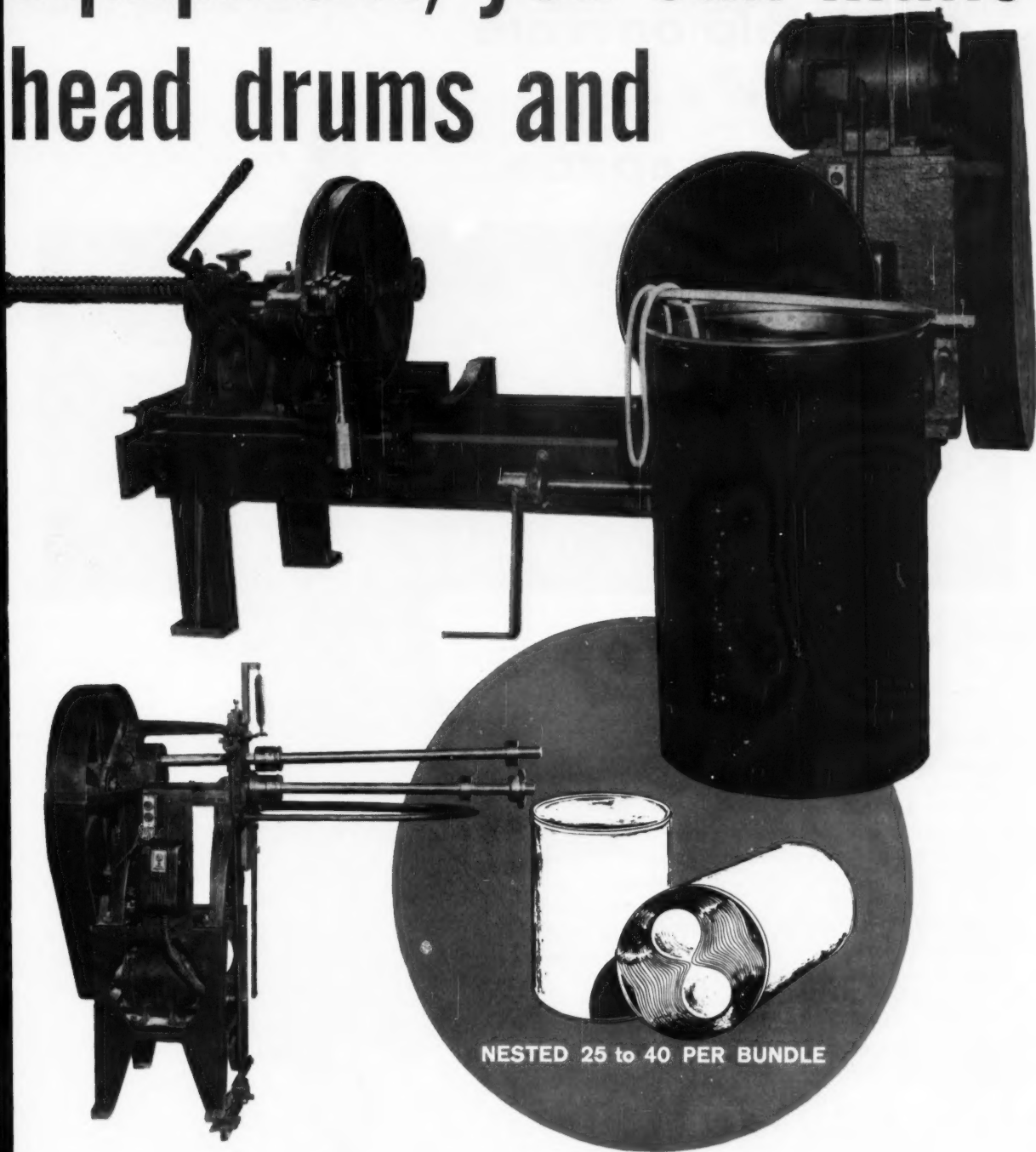
Southern States equipment and KD drums can offer you many advantages if you are using full removable head containers. Available in 22 to 28 gauge steel, the bodies and all components are painted prior to shipment. The assembly and forming equipment is simple to operate under the training of a Southern States engineer in your plant. We will be pleased to supply you with complete information, at no obligation, upon request. You will find this system to your advantage. For dry and semi-solid materials, this method is unexcelled for saving space and money. Write to us today.



Chemical Products Corporation, Cartersville, Georgia

had been using full removable head drums for some time. Storage was a problem initially and then they installed the Southern States system. Southern States equipment was installed in their plant so that their machine operator can assemble drums as needed. Storage requirements have been reduced to one sixth and the operation has been completely satisfactory, according to Mr. Ben H. Collier purchasing agent.

equipment, you can make head drums and



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THE BUSINESS MAGAZINE OF THE CHEMICAL PROCESS INDUSTRIES

a tip to
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 who also use

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...you can include
SSF with Blockson
 phosphates in your

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SSF does
 these jobs well

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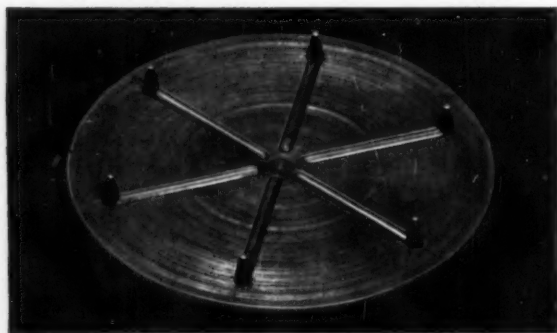
THE RAW MATERIALS OF PROGRESS

fluor

BRAND ELASTOMER

New FLUOREL Brand Elastomer is a highly fluorinated synthetic rubber that successfully resists corrosive chemicals, fuels, solvents and ozone

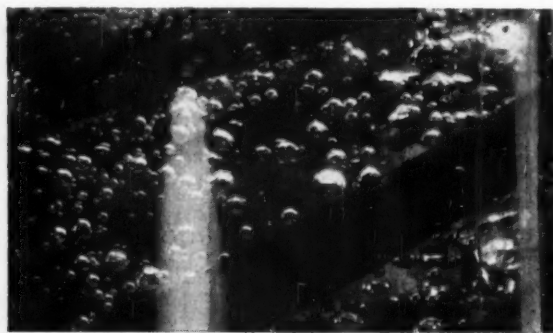
FLUOREL Elastomer is rated for continuous long-time service at 400°F . . . tolerates 600°F temperatures, and higher, for reduced periods under some service conditions. In addition to good thermal stability, ease of processing, non-combustibility, and excellent resistance to compression set are other outstanding features.



EASE OF PROCESSING is shown by this disc. Note the reproduction of machine marks from mold surface. FLUOREL Elastomer is sold by the 3M Company as a gum. It can be readily mold processed on standard rubber compounding and fabricating equipment. It may be molded, extruded and bonded to most metals.

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WHEREVER THE HEAT'S ON, put FLUOREL Elastomer to work for you. It's in use now or under evaluation in the missiles and aircraft, automotive and chemical processing industries for oil seals, "O" rings and gaskets. Other suggested uses: fire walls, air ducts, fuel cells, fuel and hydraulic hose, diaphragms and tank linings.

MINNESOTA MINING AND MANUFACTURING COMPANY

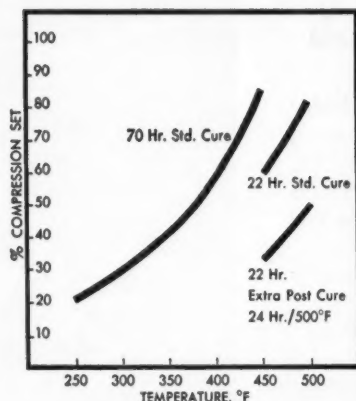
... WHERE RESEARCH IS THE KEY TO TOMORROW



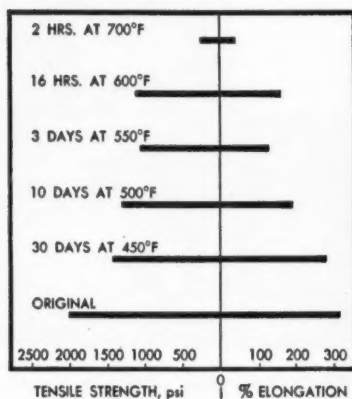
VIEWPOINT

el*

Charts below illustrate FLUOREL Elastomer resistance to compression set and heat. COMPRESSION SET (ASTM D-395-52T, Method B)



THERMAL STABILITY (Circulating Air Oven)



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THE DRUG PRICE PROBE may be a blessing, not a threat. Such a conclusion about the forthcoming investigation of the pricing policies of pharmaceutical firms by a subcommittee headed by Sen. Estes Kefauver (D., Tenn.)—see also page 36—is counter to general thinking. But to us, it is the only valid conclusion. Here's why:

- Sen. Kefauver is up for reelection in '60. Because of the obligations he has to various home-state groups—notably including the retail drug organizations—he is not likely to want to go deeply into the questions of the "fair trade" retail price structure for prescription pharmaceuticals.

- The past hearings of Kefauver's subcommittee have centered around proving the intricate and controversial "administered price" economic theories of subcommittee staff director John Blair. It is not likely that those who currently disbelieve these theories can be won over in hearings that will probably be dedicated to merely duplicating the type of information developed in past "administered price" hearings on autos, steel and bread.

- After many years in which cooperative industry efforts were often wasted through duplication by the various drug trade associations, the industry, through the Pharmaceutical Manufacturers Assn., is learning how to speak with a single voice. And PMA is embarked on an ambitious fact-finding program that may, once and for all, counter the claim that "drug prices are too high."

In addition, PMA has shown its guts in its response to a recent, violent attack on drug advertising and promotion. Its action may well keep member companies out of similar situations in the future.

- In preparing testimony for the forthcoming hearings, individual companies will have the opportunity to present valid case histories of the financial and technical gambles they have taken in developing new drugs.

Obviously, in any hearings, industry will be speaking to a minority. For it is impossible to speak to most of the public; the general public's interest in investigations is in the sensational charges and head-

lines. But the fact that drug firms will appear first gives them some sort of a headstart.

If only the minority—the thinking men—can be approached with a reasonable argument, how can drug firms tell their story to the general public? To us, current approaches are wrong. For no one likes to buy drugs—and few laymen, when shell- ing out \$12 for 20 little green cap- sules, are rational enough to re- member that it is today's alternative to a \$500 hospital bill.

So we submit that the drug in- dustry is pretty much talking to it- self when it compares the price of an average prescription to that of "a little more than one carton of mentholated cigarettes or a fifth of second-rate whiskey"; or when it reports that drug prices have in- creased less than half as much as the cost of groceries.

What's the right approach? A motivational research study of con- sumer thoughts on high drug prices might be a good way to find out.

H. C. Johnson

Editor-in-Chief

MEETINGS

Technical Assn. of the Pulp and Paper Industry, fourteenth engineering confer- ence, Penn-Sheraton Hotel, Pittsburgh, Oct. 11-15.

American Society for Testing Ma- terials, spectroscopy symposium, San Francisco, Oct. 11-16.

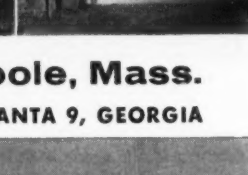
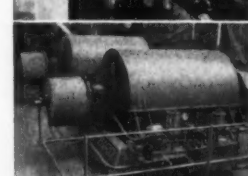
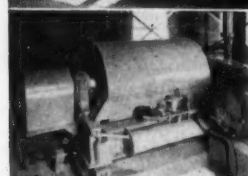
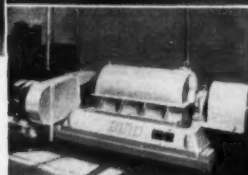
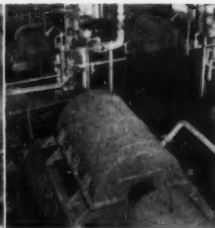
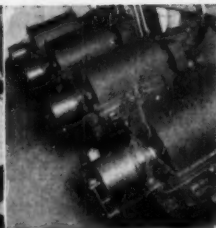
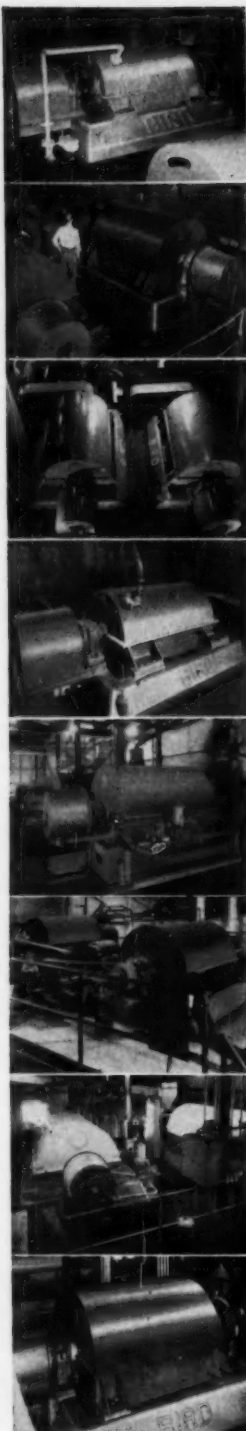
American Society for Testing Ma- terials, second forum on nuclear prob- lems, Sheraton-Palace Hotel, San Fran- cisco, Oct. 13.

Society of Plastics Engineers, two- day technical conference; subject: Plastics Engineering Today; Ambassador Hotel, Los Angeles, Oct. 13-14.

Parenteral Drug Assn., annual con- vention, Statler Hotel, New York, Oct. 14-16.

American Ceramic Society, Glass Di- vision meeting, Galen Hall Hotel, Wern- ersville, Pa., Oct. 15-16.

Chemical Specialties Manufacturers Assn., first educational technical clinic on aerosols, Sheraton-McAlpin Hotel, New York, Oct. 17; LaSalle Hotel, Chi- cago, Oct. 24.



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TYPICAL TESTS

MONO-OLEFINS

Propylene (wt.%)	99.5
Other	0 ppm

PARAFFINS

Ethane	100 ppm
Propane	0.5%

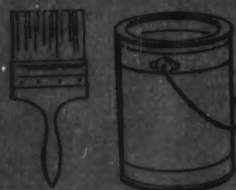
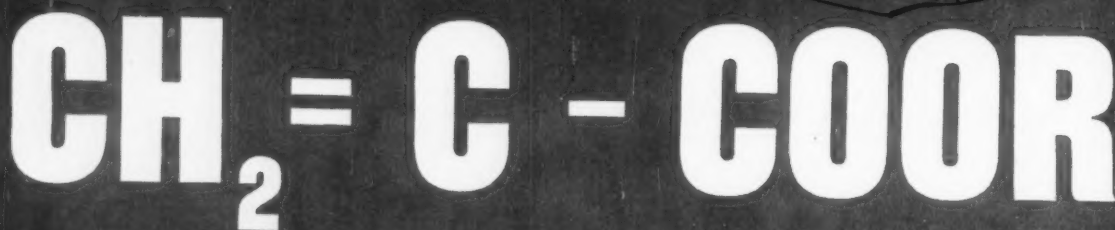
NON-HYDROCARBONS

Oxygen	6 ppm
Nitrogen	10 ppm
Carbon dioxide	6 ppm
Water	25 ppm
Sulfur	4 ppm

SINCLAIR

Petrochemicals, Inc.

Subsidiary of Sinclair Oil Corporation
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methyl acrylate

ethyl acrylate

butyl acrylate

2-ethylhexyl acrylate

methyl methacrylate

ethyl methacrylate

butyl methacrylate

hexyl methacrylate

glacial acrylic acid

decyl-octyl methacrylate

lauryl methacrylate

stearyl methacrylate

glacial methacrylic acid

ACRYLIC MONOMERS

FROM ROHM & HAAS

valuable in polymerization reactions and as chemical intermediates

The structure of the acrylic and methacrylic acids and esters permits these reactive chemicals to be used for a wide variety of applications. The double bond in the vinyl group in each monomer allows polymerization or copolymerization reactions to form polymeric chains. These monomers can be polymerized by bulk, suspension, solution, and emulsion polymerization processes. Proper monomer selection plus appropriate method of polymerization can produce polymers ranging from soft, rubbery materials to hard plastics. Acrylic monomers also copolymerize readily with a large number of other monomers—vinyl chloride, vinyl acetate, acrylonitrile, butadiene, styrene, and many others—and can impart valuable modifications to the physical and chemical properties of the resulting copolymers.

Benefits Imparted to Copolymers—Internal plasticization is a major advantage gained by using certain acrylic esters, such as ethyl acrylate, butyl acrylate or 2-ethylhexyl acrylate, in copolymerization. Since the acrylic plasticizing agent is linked chemically in the copolymer chains, it does not migrate or volatilize, and it cannot be extracted by solvents. Other benefits of copolymerization with appropriately chosen acrylic monomers include: increased rate of polymerization, better heat and light stability, improved compatibility with other resins, better adhesion properties, greater toughness, better freeze-thaw and mechanical stability in polymer emulsions, solubility in alkalies, and improved oil resistance.

Polymer Applications—Acrylic monomers are useful in the production of polymeric materials for latex paints and other types of emulsion and solution coatings, plastic sheets and molding powders, textile finishes,

packaging films, paper coatings, leather finishes, adhesives, oil additives, and elastomers.

Acrylic Acids and Esters as Intermediates—As intermediates, acrylic and methacrylic esters undergo the following reactions: (1) Diels-Alder reaction with dienes to form cyclo-aliphatic esters, (2) addition of active-hydrogen compounds to give β -substituted propionates; they react with compounds such as halogen acids, alcohols, phenols, sulfur compounds, ammonia, amines, hydrazine, phenylhydrazine, and nitroparaffins, (3) transesterification, (4) reaction with acetylene, olefinic double bonds, benzene, halogens, and many other agents. Most of the reactions of the double bond of acrylic and methacrylic acids are similar to those of the esters. In addition, the acids undergo reactions typical of the carboxyl radical. Acrylic monomers are worth consideration as intermediates in the preparation of pharmaceuticals, surface-active agents, photographic developers, and many other products.

Technical bulletins covering numerous aspects of Rohm & Haas acrylic monomers are available. If you would like copies pertaining to your processing operations, write to Dept. SP-15.



Chemicals for Industry

**ROHM & HAAS
COMPANY**

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Anti-static properties of **Fatty Nitrogen*** Chemicals may improve your product or process!

General Mills Aliquats neutralize irritating static charges—keep surfaces free from dust and lint!



In the above left photo, a nylon sample has been highly charged with static electricity. Above right, the same nylon sample has been sprayed with an anti-static agent based on Aliquat H-226 and shows no static charge whatsoever! Ease of application, as demonstrated by the stewardess at left, can be achieved by using aerosol cans.

Anti-static agents based on Aliquats serve industry, commerce and homes in eliminating irritating charges

General Mills' fatty quaternary ammonium chlorides

(Aliquats) show possibilities for anti-static agents both in the manufacture of fabrics and films and for the home, in laundries and in business . . . protecting rugs and other fabrics from the irritating effects of static electricity.

How Aliquats work as anti-static agents

When Aliquat H-226 (dihydrogenated tallow dimethyl ammonium chloride) is deposited on the surface of natural or synthetic fibers it neutralizes whatever static charges may be present in the material.

Applications

Wherever natural and synthetic films and fibers are found—in rugs, seat-covers, clothing and other articles—Aliquat-based anti-static agents work equally well. Commercial launderers will find that an Aliquat-based anti-static agent eliminates irritating static charges that make volume clothes-handling difficult.

Formulation and packaging

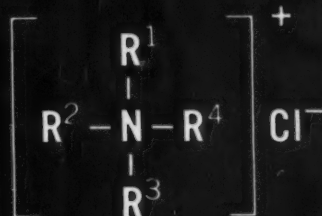
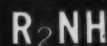
Aliquat-based anti-static agents are easy to formulate and can be packaged in aerosol cans for convenient storing and easy application.

NOTE: The unique properties of all our fatty nitrogen chemicals, including Aliquats, suggest many uses. Fatty nitrogen chemicals have already proven successful in petroleum additives, ore flotation reagents, hard rubber mold release agents, bactericides and chemical intermediates!

Perhaps your own requirements and imagination will find still more!

For more information on Fatty Nitrogen Chemicals write: Chemical Division, General Mills, Kankakee, Illinois, Department CW 8.

* Fatty Nitrogen Chemicals



Above left, fatty primary amine; above right, fatty secondary amine; center, fatty diamine; lower left, fatty tertiary amine; lower right, fatty quaternary ammonium chloride.

These General Mills high quality Fatty Nitrogen chemicals are reactive organic compounds, derived from fatty acids of varying molecular weights and different degrees of unsaturation. The alkyl chain linearity of the parent fatty acids is carried over to the Fatty Nitrogen derivatives.

These key properties make Fatty Nitrogens extremely promising in many industries:

- ✓ SURFACE FILMING—Fatty nitrogen derivatives absorb on metal as a monomolecular film and protect the metal from corrosive environment.
- ✓ SELECTIVE ADSORPTION—Fatty amines preferentially adsorb on certain nonmetallic mineral surfaces; this surface modification enables the separation of ore components.
- ✓ CHEMICAL REACTIVITY—The fatty nitrogen derivatives are unique building blocks for organic chemical synthesis.
- ✓ SOLUBILITY—The fatty nitrogen derivatives have characteristic solubilities in a wide variety of polar and nonpolar solvents.
- ✓ SURFACE ACTIVITY—The fatty nitrogen derivatives are cationic emulsifiers, wetting agents and detergents.
- ✓ BIOCIDAL ACTIVITY—The fatty nitrogen derivatives are effective against certain bacteria, fungi and algae.
- ✓ BASE EXCHANGE—The fatty nitrogen derivatives can replace inorganic ions in clays to make the clays compatible with organic liquids.
- ✓ LUBRICITY—Fatty nitrogen derivatives, electrochemically adsorbed on fibers and fabrics, lubricate the individual fibers and confer softness.

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When it's hot it pours!

Now you can say good-bye forever to the hot weather annoyance of having granular resin solidify in the bag. *Shell Chemical's new Epon resin 1002 will not sinter even when your workroom temperature crowds the 100 mark!*

Epon 1002 is a new grade of resin that is hard and free-flowing at elevated temperatures. You will find it more economical to buy and use because it saves labor and handling costs.

It resists sintering during shipping and storage. Epon resin 1002 may be used as a direct replacement for popular Epon 1001 in amine-cured, clear and pigmented surface coating systems, pre-impregnated glass cloth and other applications.

Epon 1002 is similar in performance to Epon 1001. Coating systems based on either resin give superior impact resistance, flexibility, plus excellent

resistance to water, boiling caustic, many acids and most solvents. If force curing is desirable, Epon 1002 coatings are resistant to over-bake.

For greater ease in handling, Epon 1002 is packaged in 50-pound, polyethylene-lined, multiwall paper bags . . . simple to store and use. For complete information, including technical bulletin SC:58-107, write to your nearest Shell Chemical district office.

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IN CANADA: Chemical Division, Shell Oil Company of Canada, Limited, Toronto



Business Newsletter

CHEMICAL WEEK
October 10, 1959

Two new CPI projects show how the U.S.S.R. uses economic aid to smooth over political friction.

- In Egypt, where President Nasser has been taking an anti-Communist tack of late, the Soviets will provide technical aid for an \$8-million, state-owned pharmaceutical plant. Planned annual output: sulfur compounds, 100 tons; salicylic acid, 30 tons; sodium salicylate, 30 tons; aspirin, 90 tons; penicillin, 6 tons; streptomycin, 4 tons.

- In India, where Communist prestige is also on the downgrade, the Soviet Union signed a contract last week giving India a \$100-million, long-term credit for a new oil refinery at Barauni, Bihar State. Soviet aid to India is expected to increase sharply in time with the third five-year plan, which is now in the final draft stage.

But aid from the U.S. is also on the upswing. The U.S. is already India's largest source of private capital. In the latest deal, Firestone will put up India's first synthetic rubber plant, a \$30-million complex that will include facilities to make butadiene, styrene, and copolymers, using local raw materials (including alcohol from sugar cane). Half the capital will come from Firestone and private U.S. and United Kingdom banks; the rest will be raised in India. Capacity: 30,000 tons/year; initial output: 20,000 tons/year.

•
Watch for another big U.S. synthetic fiber plant sale to Russia. Von Kohorn International, which has sold the Soviets a polyester and a viscose plant in the past two years, is now negotiating a contract for another fiber plant, *CW* learned last week.

Von Kohorn has tentative approval from the Commerce Dept. It has lost a number of other contracts because Commerce refused to license it, says VK's executive vice-president, Ralph Von Kohorn. But he believes that even with the present policy on strategic controls, an "incredible amount" of new U.S.-Soviet business would result simply if credit restrictions were lifted. U.S. government officials disagree (*see p. 35*).

•
First explosion in more than two years of operation at the Hercules propellant plant at Kenvil, N.J., early this week, killed two employees and destroyed three buildings. Source: two 500-lb. mixers containing a smokeless powder being developed for a solid-fuel engine.

•
Crown Zellerbach will step up manufacture of chemicals from its pulping operations with immediate construction of a chemical complex at Bogalusa, La. Scheduled for early '60 startup is a dimethyl sulfoxide plant (5 million lbs./year); a 10-million-lbs./year dimethyl sulfide (DMS) unit is to be completed shortly thereafter.

The company now makes the sulfide, precursor of the sulfoxide,

Business Newsletter

(Continued)

at its Camas, Wash., plant, which will supply the Bogalusa plant until completion of the new unit. Dimethyl sulfoxide is finding increased uses in chemical specialties; but CZ may be aiming to push its use in synthetic fiber making as a solvent—possibly for the new acrylics.

One big question in the chemical industry today—Who will supply dimethyl terephthalate for Fiber Industries Inc.'s Teron polyester fiber production at Shelby, N.C.? Best bet: Hercules Powder Co. Hercules plans to triple DMT production (now 12 million lbs./year) at its Burlington, N.J., plant. Completion of the multimillion-dollar project is set for Oct. '60.

Hurricane Gracie disrupted several chemical operations last week as it ripped through the South. It tore off roofs, soaked raw materials and end-products at a cost of several hundred thousand dollars. In the Charleston, S.C., area, Virginia-Carolina Chemical Corp. was among chemical companies hardest hit, with damage running well over \$100,000. At week's end, however, the plant was back in partial operation.

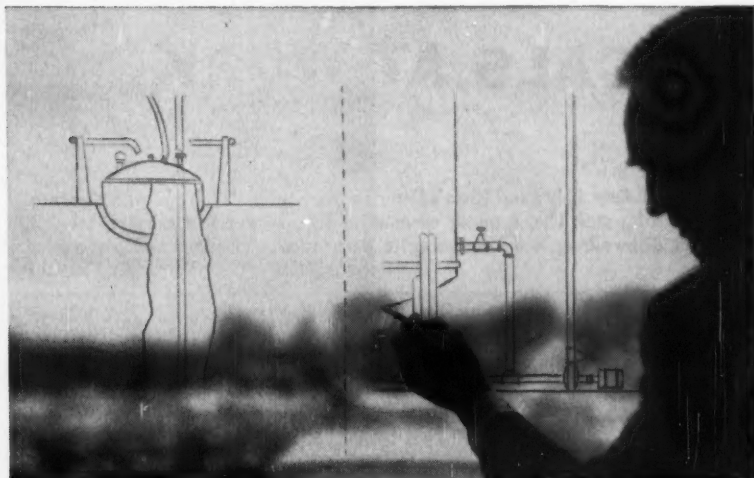
Davison Chemical's fertilizer plant was also hit hard. And then because Esso's 3.25-million-gal. gasoline storage tank exploded a block away, Davison kept its sulfuric acid unit shut down until Saturday.

Mass spraying of pesticides may have lost legal status last week. The second circuit court of appeals refused to grant an injunction against aerial spraying of DDT—but only on a procedural point. Last year, the U.S. district court in New York denied the request for an injunction against the U.S. Dept. of Agriculture's campaign against gypsy moths on Long Island, holding that spraying was a proper exercise of the government's police power and that DDT as used in that campaign was not harmful (*CW Business Newsletter*, June 28, '58). Now the appeals court says the plea for an injunction should be dismissed simply because there's no indication that USDA plans to conduct any more spraying in that area. In any future spraying program, it adds, the district court should re-examine the proposed practices for spraying "in the light of available techniques and circumstances."

New power allocations are brightening faces at Niagara Falls. Late last week, an additional 200,000 kilowatts—445,000 kw. have already been allocated (*CW Technology Newsletter*, June 6)—was made available to 13 companies, including Hooker Chemical, 55,000 kw.; Carborundum, 29,000; Olin Mathieson, 15,000; Great Lakes Carbon, 13,000; International Graphite and Electrode Division of Speer Carbon, 12,000; Stauffer Chemical, 7,000; Titanium Alloy Mfg. Division of National Lead, 7,000; International Minerals & Chemical, 5,000; Kimberly-Clark, 5,000. Five firms, including Du Pont, Food Machinery and Chemical and International Paper, were turned down in their bids for more power.

BRIEFS

on a useful manual on handling caustic soda... phosphorus chlorides for organic synthesis... a special plasticizer for vinyl plastics



Caustic soda handling from tank car to process

An authoritative study of this subject is covered in our *Caustic Soda Engineering and Handling Guide*, a 40-page manual designed for engineers.

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It includes:

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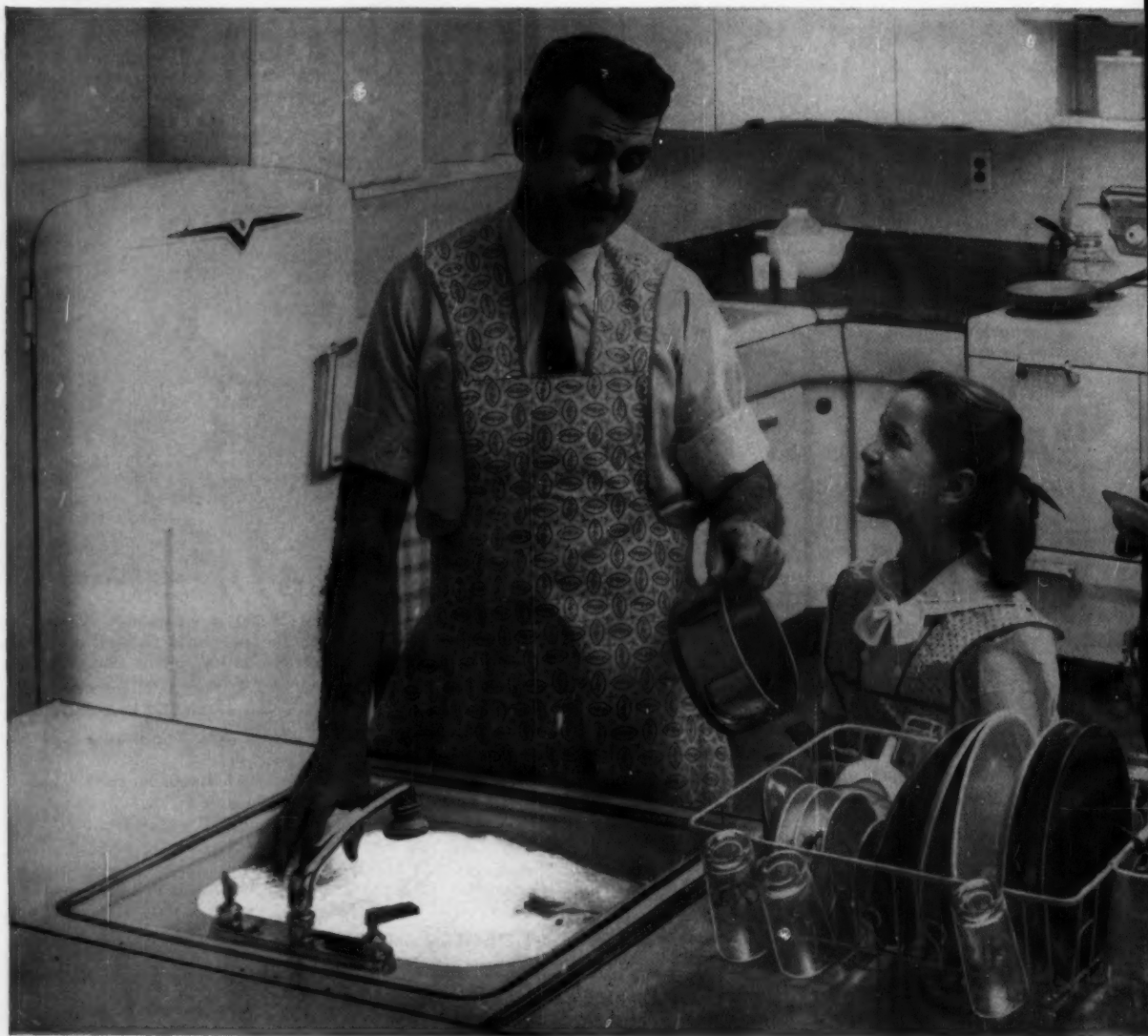
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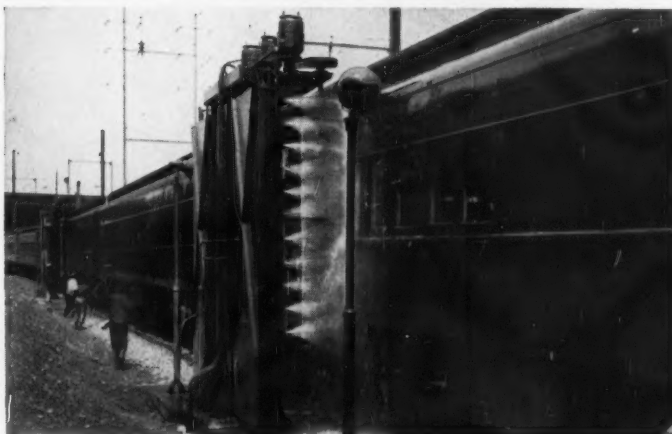
WHILE MOM'S AWAY, the "togetherness" of dirty dishes and Ultra's Detergents make Dad's job *almost* a pleasure. Easy to use, they are equally effective in hard or soft water. They form the economical basis of scores of privately labeled, heavy-duty detergents for uses ranging from dishwashing and laundering to dairy utensil cleaning and carwashing compounds.



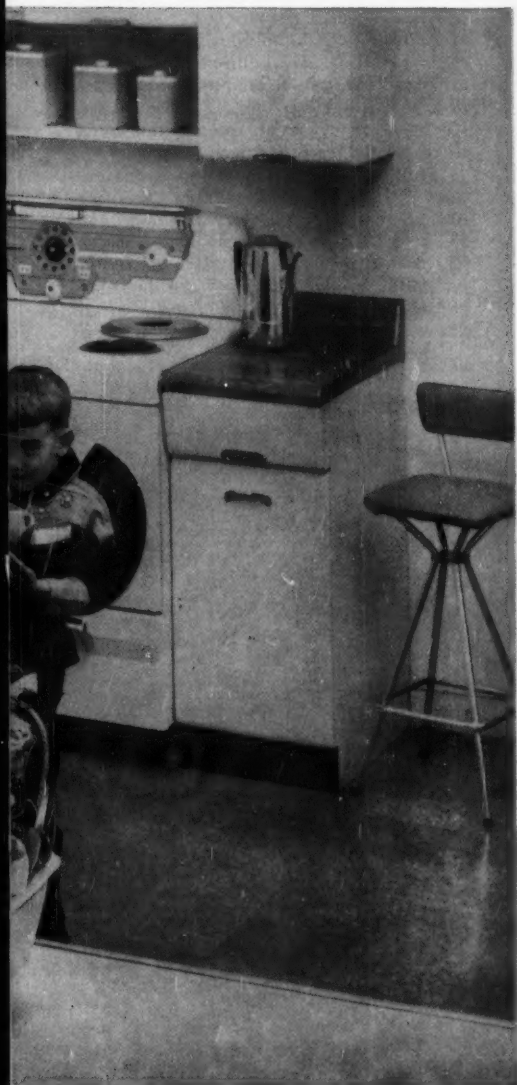


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Dept. CW-10

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news briefs...

ON THE CREATIVE USE OF
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fast-curing, low-cost with
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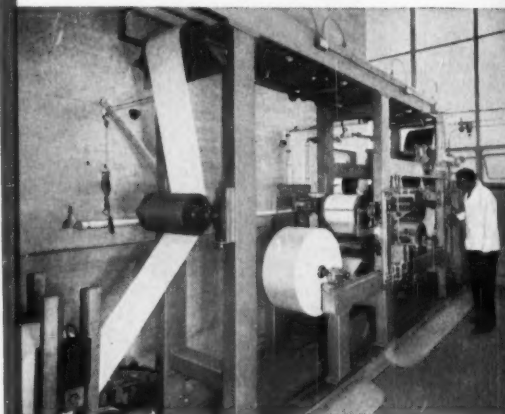
However they're formed—extruded, molded, calendered, dipped, foamed—rubber products benefit from M & C's ASP fillers. Processors like most the fast cures and high loadings—plus the higher modulus and tensile, and easier processing. Belden Manufacturing Company likes all of these factors too... puts the ASP's in its rubber-insulated wire (see photo).

The ASP's are water-washed, water-fractionated from kaolin to give them that uniformity, freedom from grit, and bright color which make them such top performers. They'll better your products and cut costs, too... this is a *starred* item... use the coupon.

High-speed Coating Machine boosts Research Center's capabilities in Edgar Paper Clays

Photo shows high-speed paper coater just installed in M & C's Research Center at Menlo Park. Top speed is 2,000 fpm. Basically a roll coater, the new coating machine is sufficiently flexible to duplicate most coating methods. It is equipped with a trailing blade and may be adapted to duplicate reverse roll, gravure, and air knife coating. Its infra-red driers are augmented by a steam-heated Yankee drier.

Installed for development and evaluation work with M & C's *Edgar Paper Clays*, the coating machine is a major addition to one of industry's most completely equipped labs for work in coating clays... developing and evaluating products to meet the demands for ever-higher quality in paper-coating clays. Keep posted on Edgar Paper Clays... check the coupon.



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M & C's ASP aluminum silicate extender pigments pass the *Chemist's* scrutiny for uniform purity, color, and particle size... satisfy *Production's* requirement for easy dispersibility and dependable supply... meet *Purchasing's* strict economy. ASP's are water-washed to virtual chemical-inertness—make paint products of outstanding stability and weatherability.

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Glidden technician runs a Stormer viscosity... one of the control measurements for checking, maintaining quality performance. ▶



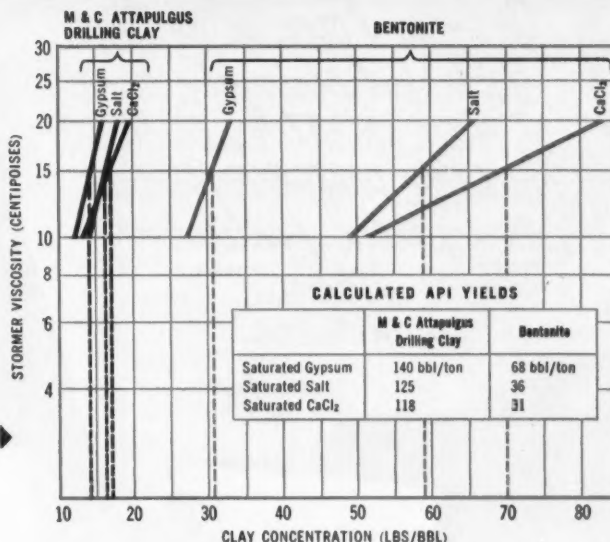
**Drilling Mud costs shaved by high-yield,
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Cost-cutting potential of M & C's improved Attapulug Drilling Clay in muds is shown by API Yield comparisons with Bentonite in chart.

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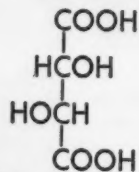
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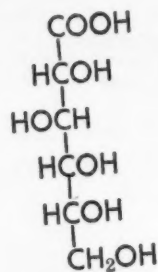
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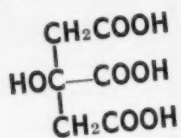
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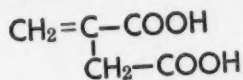


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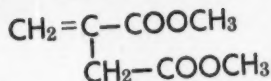
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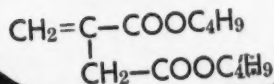


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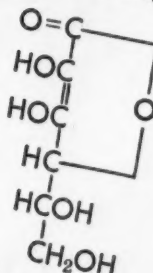
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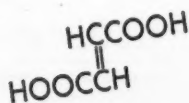
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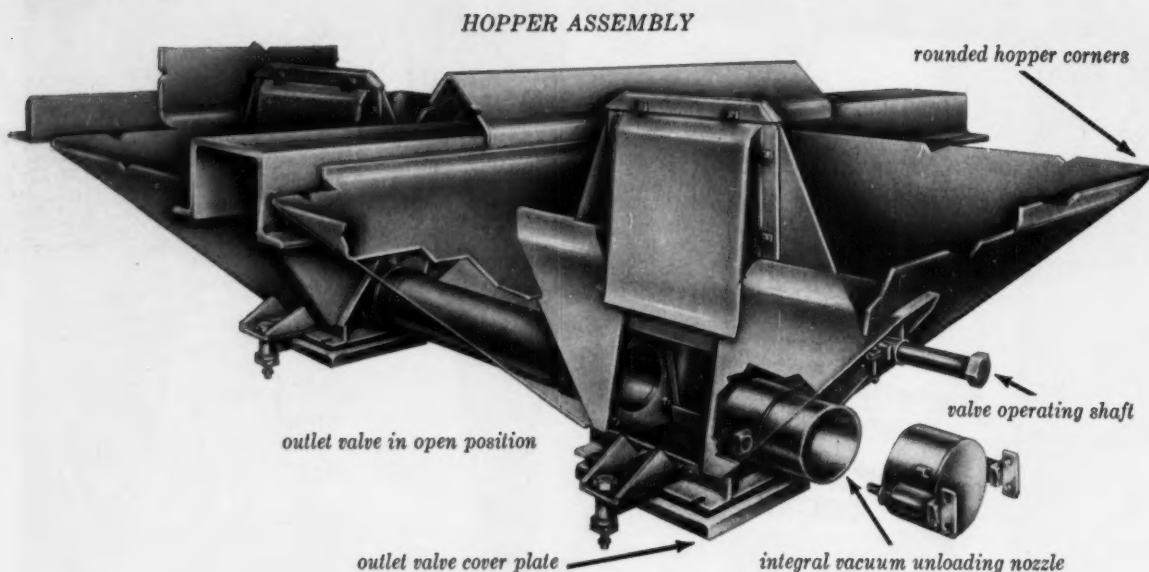


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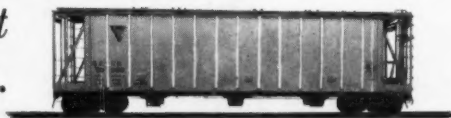
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ONE great
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two forms
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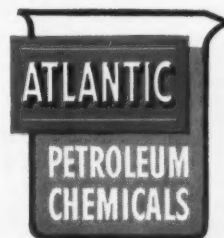
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Philadelphia • Providence • Charlotte • Chicago • Los Angeles • In Canada: Naugatuck Chemicals Division of Dominion Rubber Company, Ltd.
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What's new in processing chemicals?

News has a cash value for the chemical processor. Whether it's about new products or new applications for familiar products, this news can make the difference between keeping ahead of competition and having to catch up with it. This series of chemical news notes is designed to help you keep products, processes . . . and profits up to date.

You may wish to check certain items in this advertisement and forward to those concerned in your company.

ROUTE TO:

GLYCERINE FORECAST: BRIGHT FUTURE FOR VERSATILE WORKHORSE CHEMICAL

Since development of the synthetic product in 1947, glycerine has enjoyed an extension of usefulness because of improved purity made possible by its chemical production. Today, new improvements in manufacturing techniques have upgraded Dow's synthetic glycerine. As a result, profit-minded production men are presently re-evaluating glycerine as a replacement for more expensive processing chemicals.

Long a favorite "workhorse" chemical in the chemical processing industry, glycerine is, of course, well known chemically and physically.

Glycerine's versatility is exemplified by the unusual number and variety of derivatives that can be formed by reaction with other chemicals. Typical of many useful types of glycerine reactions possible are: etherification, amination, and reaction with alkali metal hydroxides.

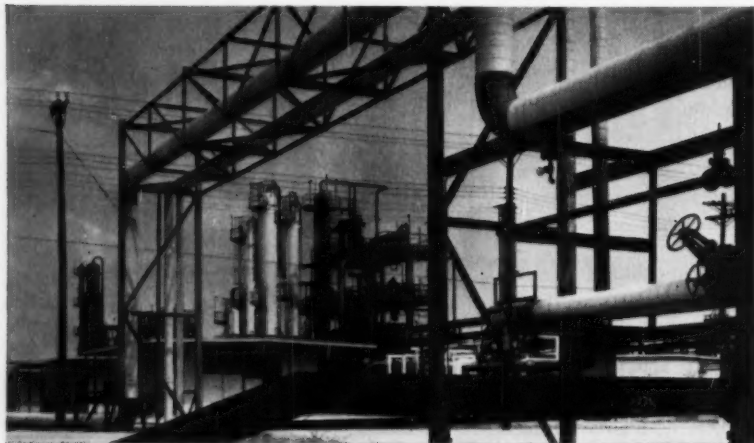
PHYSICAL TALENTS, too, account for the many millions of pounds of glycerine that go into nonchemical uses. Here it functions as plasticizer, humectant, solvent, bodying agent, and lubricant, in a variety of product roles. Glycerine

is "made to order". It stays free from objectionable color, odor or taste almost indefinitely. Along with its stability, other talents pressed into service in varying combinations include its hygroscopicity, low volatility, solvent power and solubility, high viscosity, non-crystallinity, low toxicity, compatibility, and taste (sweet and pleasant).

The glycerines from Dow are three: GLYCERINE SYNTHETIC is the indicated choice in nearly all industrial applications (including lighter colored alkyd resins in paints). GLYCERINE, USP was developed to meet U. S. Pharmacopoeia requirements, including glycerol content of 95%. Dow's quality runs, in fact, 96%—a strength many users wish because: the viscosity is considerably below that of 99.5%. It is easier to handle, and does not freeze easily. Color is water-white for uses requiring high purity, with taste and odor characteristics desirable for pharmaceutical and food uses.

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Production facilities for Dow's synthetic glycerine at Freeport, Texas.

the original source to the finished product. Wherever long range industrial plans concerning processes and products require glycerine of consistently high quality, Dow will deliver it promptly . . . in drums, tank cars or shiploads . . . from bulk stock points located at Bayonne, New Jersey; Chicago, Illinois; Freeport, Texas; Oakland, and Torrance, California.

CAUSTIC SODA—

coming at you 14 ways

Early this year, when construction was completed on a distribution terminal in St. Louis, Missouri, the number of caustic soda terminals maintained by Dow across the country came to nine.

Last October, a multimillion dollar plant for 50% and 73% caustic soda went into production at Plaquemine, Louisiana, ten miles south of Baton Rouge. With plants in Michigan, Texas, California and Ontario, Dow now has a total of five production plants.

All together, this brings to fourteen the number of shipping points operated by Dow, coast to coast, for caustic soda, bulk or dry, delivered by barges, tank cars and trucks. Behind this distribution service is a technical service that's second to none in solving problems for manufacturers in every industry.

★ ★ ★ ★

WE HAVE ROOM here for only a few notes on but a small percentage of all the chemicals we supply. For information in depth on any chemical, we invite you to write THE DOW CHEMICAL COMPANY, Midland, Michigan, Chemicals Merchandising Department 992AM10-10.

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THE DOW CHEMICAL COMPANY

Midland, Michigan



CHLOROTHENE . . . cost cutter for aerosols

Lowering of unit costs is the goal of all manufacturers. One path to this goal in aerosol products is the use of a versatile Dow solvent, Chlorothene®, (1,1,1-trichloroethane, inhibited).

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4 NEWS NOTES on other chemicals . . .



DEVELOPMENTAL CHEMICALS

Research chemicals currently available in limited quantities from Dow are listed by name, structural formula, description, property data and size of sample in a new 56-page booklet entitled "Research Chemicals from Dow".



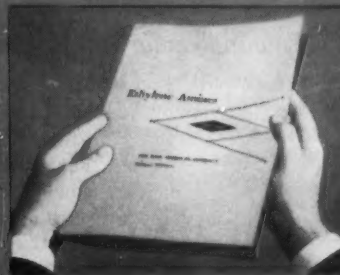
ALKANOLAMINES

If you are interested in discussing emulsion formulation in such fields as pharmaceuticals, cosmetics, agriculture, and home use wax and polish products, Dow technical service and development men can help you.



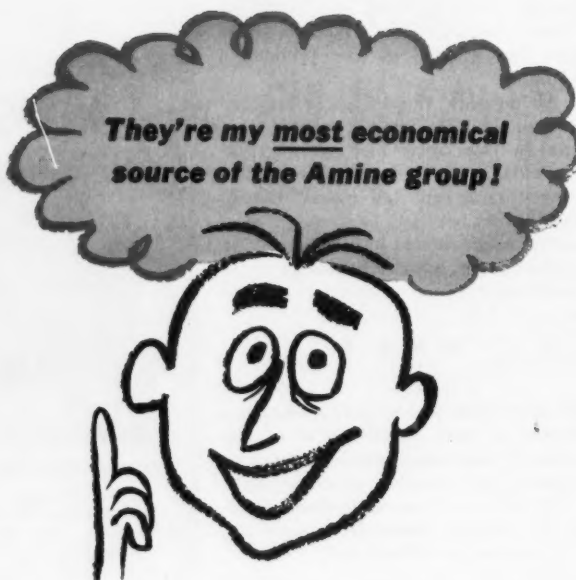
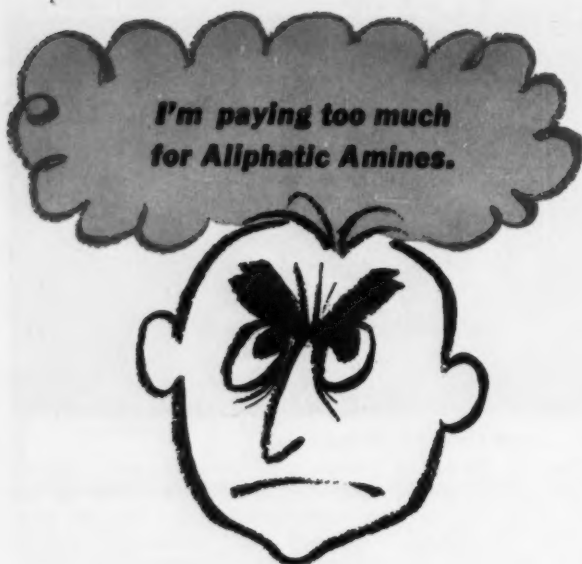
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Dow offers the only line of glycol ether solvents including both an ethylene and propylene series of products trademarked Dowanol®. Their broad use as chemical intermediates and their versatility as solvents make them very popular.



ETHYLENE AMINES

A new technical treatise, recently made available to chemists and engineers, discusses Dow's ethylene amines—ethylene-diamine, diethylenetriamine, triethylenetetramine and tetraethylenepentamine. Send for this informative book.



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"Losses caused by damaged bags have been reduced by at least 75% since we started shipping our twelve different formulas of ammonia phosphate and sulfate fertilizers in WONDERWALL bags," says Mr. Alfred G. Roecks, assistant plant manager at the Best Fertilizers Company, Lathrop, California.

The Best Company packs 80# of fertilizer in a sewn valve bag, 15" x 4½" x 32½". The old 4-ply natural kraft bag they used was 1/40, 2/50, 1/60, totaling 200# basis weight. The 3-ply WONDERWALL bag they are now using is 2/50, 1/70, totaling 170#. These bags—15% lighter—have proved to be *stronger* than their previous 4-ply bags!

WONDERWALL is West Virginia's new, tougher multi-wall that outperforms ordinary bags because it's made of Kraftman Clupak* paper. This extraordinary paper stretches and withstands punishment that breaks ordinary kraft. Best now plans to use bags made from Clupak extensible paper exclusively.

Besides obtaining reduced breakage, many companies packing fertilizers, feed, cement, chemicals and similar products are also achieving substantial bag cost savings through use of the lighter, tougher WONDERWALL bags.

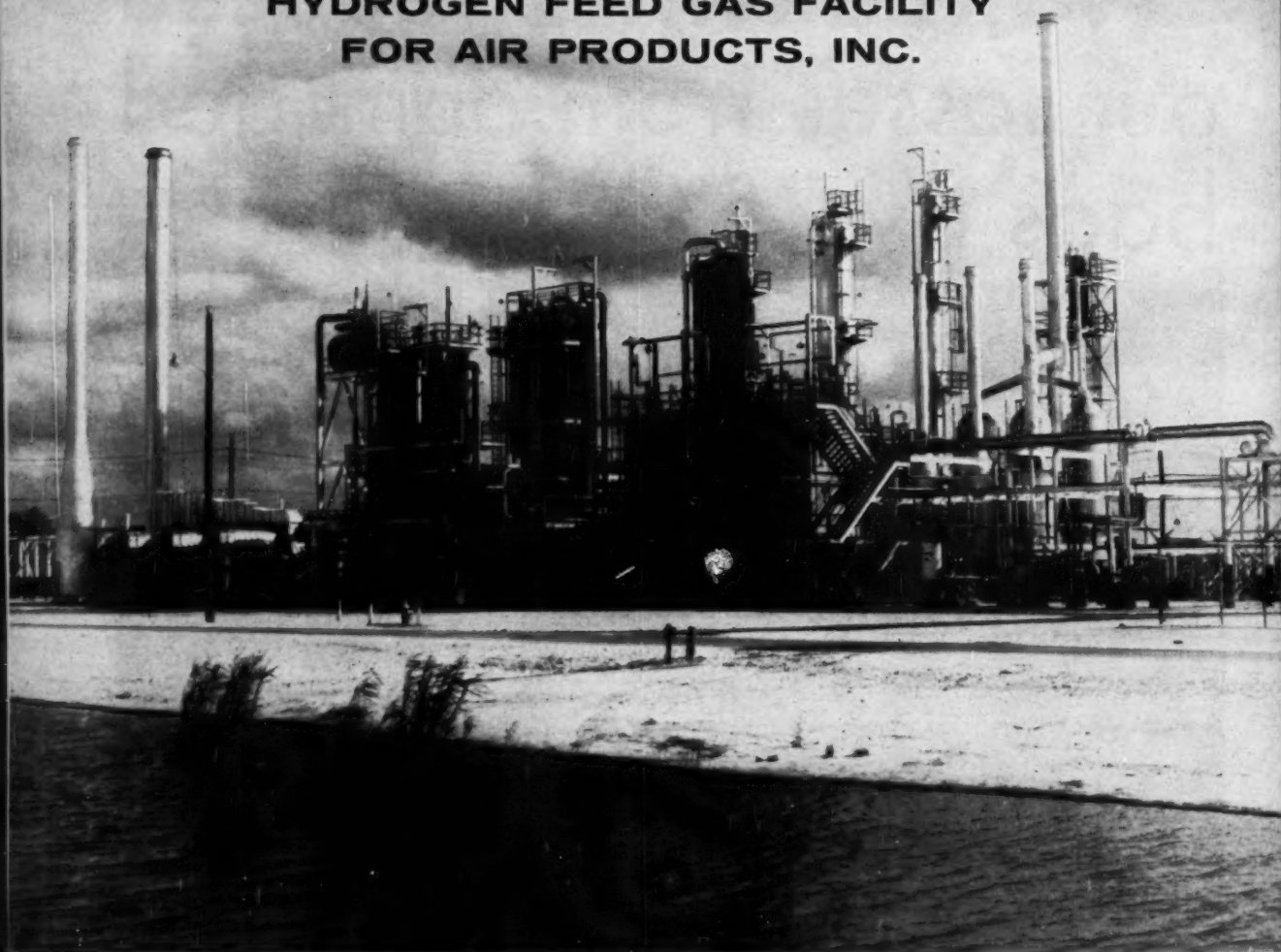
Let a West Virginia representative show you how you can cut bag costs and reduce breakage. Write or call Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Avenue, New York 17, New York.

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The world's only large tonnage liquid hydrogen facility—near West Palm Beach, Florida—has been put on-stream by Air Products, Inc. of Allentown, Pennsylvania. The Lummus-designed, engineered and constructed hydrogen production section of the plant has been producing at over-design rate and at 99+% purity (better than design) since the test run was successfully completed 21 days after the initial operation of the

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The hydrogen production section combines Florida crude oil, oxygen and water to generate hydrogen gas.

Liquid hydrogen product from the new facility assumes an increasingly vital role in the nation's defense system. New capability in handling, storing and firing liquid hydrogen in rocket engines substantially improves our nation's position in the race for missile and space superiority.

Lummus has completed a number of gas generation units in recent years, and also has extensive experience in design, engineering and construction of plants for ammonia synthesis.

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The ruling: Du Pont can keep its GM stock, but must give up voting rights



WINNER:

Du Pont's Greenewalt is 'gratified' ruling spares stockholders any tax penalties.

LOSER

Justice Dept.'s Bicks will probably appeal, ask Supreme Court to order sale of stock.



JUDGE

La Buy will ban any 'insider' sales agreements.

Big Inning for Du Pont

In Chicago last Friday, U. S. District Court Judge Walter La Buy handed down his opinion that the Du Pont Co., Christiana Securities Corp. and Delaware Realty & Investment Corp. could retain their ownership, direct or indirect, of General Motors Corp. stock, but must surrender their rights to vote it.

In Washington, it was considered a virtual certainty that Robert Bicks—acting head of the Justice Dept.'s Antitrust Division—will promptly ask the U. S. Supreme Court to intervene in this case again. (First appeal on this case followed La Buy's original finding that the charges should be dismissed *in toto*; the Supreme Court upheld La Buy's dismissal of some counts but directed him to seek a way to eliminate the possibility that Du Pont's holding of 23% of GM's outstanding common stock could be used to give Du Pont an inside track on

GM's big purchase contracts.)

Antitrust Division lawyers have fought long and hard for divestiture throughout the hearings; and they are still convinced that nothing short of divestiture is needed to put the two big companies into full compliance with the Clayton Act.

In a complex 101-page opinion, La Buy outlines these main points of the final judgment he proposes to enter:

- Du Pont loses its right to vote any of the 63 million shares of GM it owns, and the votes pass on to Du Pont stockholders, with the exception of Christiana and Delaware, holding companies controlling Du Pont stock. In addition, Christiana's 535,000 GM shares will also be "sterilized."

- Du Pont, Christiana and Delaware are enjoined from acquiring any additional stock in GM and from attempting to influence GM.

- Officers or directors of Du Pont,

Christiana and Delaware will not be permitted to vote any GM stock.

- GM may not have any officer, director or employee of the three companies on its board or staff, or as an employee.

- Any "preferential trade arrangements or understandings between Du Pont and GM must be canceled," nor may Du Pont and GM enter into any joint ventures while Du Pont still holds GM stock.

- Any existing requirement contracts between them "will be canceled and they will not be permitted" to enter into any for three years from the judgment. After that, any such agreements must be for less than a year.

Judge La Buy also provided that further review could be made of the judgment if it proved inadequate in the future, or if any legislative change in tax policy "would significantly alter the tax consequences" of a distribution of the GM stock. This is apparently a reference to the Frear bill now in Congressional committees and which may be brought up during the next session of Congress.

Who Benefits: Evident in his entire opinion is La Buy's concern for the small stockholder. Although he recognizes the corporate interests involved, he says these are "far less important than the interests of the many thousands of stockholders whose rights are directly involved. Under no theory can these stockholders be said to have participated in any violation or engaged in any improper conduct."

Du Pont President Crawford Greenewalt echoes these lines in expressing his gratification "that the court has recognized that a forced distribution of [the] stock is not necessary and would result under the present tax laws in an 'unnecessarily harsh and punitive' penalty" on small stockholders.

Next Step: La Buy's ruling, as he clearly points out, is an opinion, not a final decree. Although he proposes measures for effecting the relief asked by the U. S. Supreme Court in its judgment that Du Pont had violated Section 7 of the Clayton Act because of a "reasonable probability" it could influence GM, there's still room for argument.

Within 15 days, the various parties to the lawsuit must submit detailed plans for judgments within the frame-

work of the opinion. If these do not match up, they must be reconciled before La Buy can enter his final decree. After that, there's still 60 days in which any party can seek an appeal to the Supreme Court.

A clue to Du Pont's expectations: its comment that the opinion "leaves the door open for any party to the action to ask that a distribution be ordered if the tax penalties should be removed by legislation in the future. Accordingly, we will continue to urge passage of remedial legislation. . . ."

Immediate Impact: Should the final decree be the same as La Buy's proposal, the most immediate effect will be to relieve the minds of a vast group of Du Pont and General Motors stockholders. Inherent in the government's proposal—turned down by La Buy—was the impact on stock prices and tax payments that would result from the unloading of unprecedented quantities of GM stock on the stock market and the distribution of GM shares to Du Pont stockholders.

Effects: As to the competitive effects in the chemical industry, assessment is difficult. The decree—as proposed by La Buy—would call for a three-year cessation of any existing requirement contracts between GM and Du Pont.

But the record shows that none exist now, nor have they for some years. It's not entirely clear, however, whether such an arrangement precludes simple contracts for GM to purchase Du Pont automotive finishes or fabrics—the only products, incidentally, under consideration in the case. If such contracts were excluded, there would be that much more room for Du Pont competitors to move in.

Larger Issues: It's even harder to pinpoint the significance of the overall issues involved. The principle of law involved was set down in the U. S. Supreme Court decision of June 3, '57, when it interpreted Du Pont's 23% ownership of GM's common stock as creating "a reasonable probability" that Du Pont could at some time receive preferences from GM.

In this respect, it's hard to find many examples duplicating, or nearly duplicating, the relationship of Du Pont to GM at both the customer-supplier level and at the ownership level.

Nevertheless, the government cited the case in its efforts to block the

merger of Bethlehem Steel Corp. and Youngstown Sheet & Tube Co., saying that the consolidation would be illegal even if only a "reasonable probability" existed that the result would crimp competition.

Victor Hansen, chief of the Justice Dept.'s Antitrust Division in '57, said that the "Du Pont decision will help us in all our merger cases." It was seen as a wedge to use in the Federal Trade Commission's attempts to split up Gulf Oil Corp.'s merger with Warren Petroleum Corp., Scott Paper Co.'s acquisition of three competitors, and the International Paper Co.-Long Bell Lumber Corp. union, among others. It may be inferred from this standpoint that any proposed mergers will be scrutinized through a Du Pont-GM filter.

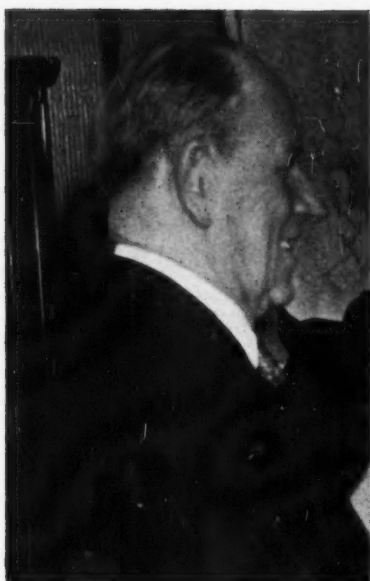
Opinion Effect: It's unlikely that much impact will be felt in the chemical process industries from La Buy's proposed decree.

Moreover, the tremendous degree of public involvement largely set the key for relief measures and it cannot be said that any other company found to have violated the Clayton Act in the same manner as Du Pont would meet the same conditions of involvement. Thus, the present ruling must stand largely as applicable to the Du Pont-GM affair and not necessarily as a precedent.

Du Pont Victory: Several things are clear, however. La Buy's opinion so strongly follows Du Pont's proposals, with the exception of the "sterilization" of Christiana and Delaware voting rights, that it has to be considered a victory for the company, and a vindication of its efforts to follow the case to its bitter end. Du Pont might possibly have been able to wangle a consent decree.

As La Buy indicates throughout his discussion of testimony and evidence presented, there's an indication that well-thought-out and carefully prepared plans of action carry great weight in evidence, pointing up the advantages to corporate management of exercising every effort to bring foresight to bear on legal actions.

Widespread consciousness of the antitrust implications of management decisions exists strongly in many chemical firms, even at the plant level. The denouement of Du Pont's case will serve to sharpen that consciousness even more.



SOVPHOTO

Soviet Trade Minister Patolichev wants an end to U.S. trade bars.



State Dept.'s Dillon says bars may drop but not enough to suit Reds.

No Boom in U.S.-Red Trade

The possibility of stepping up U.S. chemical equipment exports to the U.S.S.R. arose at a press conference held last week by Douglas Dillon, Under Secretary of State for Economic Affairs, and a leading policy-maker on trade with the Soviet bloc. If the U.S.S.R. would own up to its World War II lend-lease debts, he said, the U.S. might ease some of the restrictions that have helped squeeze U.S.-Soviet trade to a trickle.

The subject drew heated words from Premier Nikita Khrushchev on his U.S. tour.

Chemical equipment was probably foremost in Khrushchev's mind as he called for more trade. He pointed out that if the U.S. didn't relax restrictions, the Soviet Union could buy what it needs from our western European allies.

Backing up the Premier is this factor: while U.S. producers have closed only three big equipment deals lately (for two fiber plants and polyethylene tube extrusion equipment), producers in western Europe have piled up millions of dollars in orders, expect to sell even more in the next few years.

A new *CW* survey sizes up the volume of this business, and suggests the amount U.S. equipment producers

might expect if U.S. trade bars were lowered.

Germans Score Records: In terms of published export figures, West Germany offers the most dramatic example of western Europe's bustling business with the East. Last year, 18%—\$20.3 million—of West Germany's chemical equipment exports went to Communist countries. One year earlier, the East took less than 6%, worth only \$5.9 million.

But German producers probably sold the Soviet bloc a lot more chemical process equipment than is listed under this classification. A few examples of some recent deals give a much clearer idea why the Germans are scrambling for orders with such intensity.

Easily the biggest order landed by the Germans so far is the \$12-million synthetic fiber complex deal snared by Krupp.

Lurgi, another German company, sewed up two more big orders last year. To Russia it sold eight sodium sulfate (rayon cake) crystallization plants, worth \$4.5 million. Delivery started in '58, but most of the order will be shipped this year. And next year Lurgi will send Czechoslovakia a \$2.6-million gas purification plant.

The Big Contender: The United Kingdom does not publish consolidated figures for chemical equipment exports. But the almost steady stream of contracts with the Soviet bloc marks it as West Germany's big contender; it's probably the Soviet's chief Western supplier.

The latest, and one of the most significant, of British sales to the Soviet bloc is Imperial Chemical Industries' contract to supply Poland with know-how and a license for a polyester fiber plant, sale price of which was undisclosed.

Earlier, Courtaulds received three contracts (worth \$50 million) to equip two cellulose acetate spinning plants, a rayon tire-cord production unit, and an acrylic staple fiber production unit. Rustyfa is building a \$40-million tire plant in Russia and a \$21-million plant in Rumania. And Vickers-Armstrongs has a contract for a Russian synthetic fiber plant, while its offspring, High Polymer and Petrochemical Engineering, is negotiating contracts to build plastics plants.

French Advances: The French are also carving out a sizable chunk of the Soviet bloc's chemical equipment market. As with Germany, the published figures tell only part of the story. They show chemical equipment exports to the bloc as \$14,545 (at the old exchange rate) in '57, \$1.4 million in '58, and \$2.3 million in the first half of this year. But the category does not include all process equipment. Nor does it include transshipments through third countries of embargoed goods, or technology sales.

French exports rose sharply during the past six months because of the new Franco-Russian bilateral trade pact signed last November. A separate pact, covering 1959-62, will boost French sales even higher. On the list: a 20,000-metric tons/year titanium dioxide plant, a 100,000-120,000-metric tons/year caustic soda plant, \$2.2 million in plastic extrusion equipment (including polyethylene film equipment), two cellulose-from-reeds plants with an annual capacity of 25,000 metric tons/year, and assorted chemical, rubber and synthetic fiber equipment valued at \$12.7-\$16.2 million.

Among the leading French exporters to the Soviet bloc: Appareils et Evaporateurs Kestner, Societe pour l'Equipelement des Industries Chimiques.

ques, Rene et Jean Moritz, Air Liquide.

In Italy, equipment makers that supply the Eastern bloc seem to face more criticism from chemical producers than has been aroused so far in Germany, England, and even in protection-minded France. Still, exports totaled \$9.32 million last year, and are rising sharply. Montecatini alone recently sold Russia a \$24-million plastics plant, and the technology and equipment for producing maleic anhydride, titanium dioxide, acetylene, and ethylene plants.

U.S. Outlook: In the U.S., opinions vary on how large a market equipment producers could find in the Soviet bloc if the trade bars ever come down. Even if Russia were to settle its financial affairs with the U.S. government, no sweeping changes of the strategic controls list are likely.

Russia has complained loudly about the refusal of the U.S. to grant credits. But a lack of credits may not really be the major barrier to large-scale trade.

Although Soviet trade chief Nikolai Patolichev pressed for medium-term credits in arranging the Anglo-Soviet trade pact, he settled for limited export guarantees. And the Germans still grant no credits at all.

Their importance is even discounted by N. N. Smeliakov, head of Amtorg, the Soviet Union's U.S. trading agency. Smeliakov told *CW*: "We haven't asked anyone for credits. If a deal is satisfactory and profitable, we are ready to make it." With credits, he avers, orders would be much higher. But the big obstacle to more business, Smeliakov says, is the U.S. strategic controls list.

Even if a wave of good fellowship were to sweep across the Iron Curtain and wash away all U.S. trade barriers, that still would not automatically mean a large, sustained increase in U.S.-Soviet trade. Russia will pay high for high-priority equipment and know-how, but Dillon and other officials doubt if it can offer the exports to maintain a large trade volume.

And western European producers would offer the U.S. stiff price and credit competition on equipment that can be obtained there. Moreover, the U.S.S.R. might well find it politically strategic to keep alive the keen and sometimes bitter competition among Western producers, particularly Britain and Germany.



Blair, Kefauver will probe pharmaceutical price setting.

Grilling Begins for Drug Makers

Makers of "miracle drugs"—despite their triumph over polio and other crippling and killing diseases—have become favorite whipping boys in U. S. public life.

This fall, pharmaceutical producers will be defending their reputations in three official confrontations:

- This week in New York, top executives of leading producers and distributors of antibiotics are taking turns on the witness stand in a Federal Trade Commission proceeding. FTC's accusation—which is roundly denied by the five companies concerned—is that these companies conspired to prevent competition in broad-spectrum antibiotics.

- Next week in Trenton, N.J., a criminal antitrust case against five other leading drug companies will go to trial before U. S. District Judge Phillip Forman. The Justice Dept. charges that these companies conspired to fix prices on Salk polio vaccine. Typical of the defendant companies' comments on the charge: "Complete nonsense."

- And late next month in Washington, representatives of 20 pharmaceutical companies, five large banks, and a dozen investment companies and mutual funds will be on the firing line as Sen. Estes Kefauver and his antitrust subcommittee delve into al-

legations that drug prices are too high and that this overpricing is reflected in excessive corporate earnings. At the bottom of the allegedly steep price policies, according to the hypothesis of chief investigator John Blair, are various bankers and investment house officials who are interested in the securities of several or many drug companies and who influence the managements of those drug companies to set uniformly high prices.

Preview Last Week: A sampling of the kinds of left jabs and right hooks that will be thrown at the drug companies in those upcoming sparring matches was previewed last week in an all-day hearing by a committee of the New York state legislature. Spokesmen for consumer groups advocated the introduction of prescription drug insurance policies, but declared that such insurance would be unrealistic without a drop in prices.

Facing this crescendo of official criticism, the pharmaceutical industry has been slowly building up its public and governmental relations. Leaders of the industry feel that drug companies' records are clean, but are concerned about the various hearings' possible effect on public opinion—and the kind of legislation that ultimately may stem from this fall's attacks.

EXPANSION

Ethylene: Petroleum Chemicals, Inc. (Lake Charles, La.) will store ethylene in a cavern about one-half mile below the earth's surface near Sulphur, La. Capacity: 200 million lbs. initially, possibly 300 million lbs. ultimately. A Hackberry, La., site previously under consideration (*CW*, May 9, p. 90) was shelved in favor of the Sulphur location 10 miles from PCI's plant and on PCI's pipeline from Lake Charles to Orange, Tex.

Oil: Florida Oil and Refining Co., subsidiary of The Frontier Refining Co. (Denver, Colo.), is planning to build the state's first oil refinery—provided it can make arrangements to get domestic petroleum competitively. Construction on a deep-water site near Jacksonville is planned, with initial capacity of 10,000 bbls./day. Construction costs: \$10.5 million.

Rocket Propellant: Rocket Power, Inc., new subsidiary of The Gabriel Co. (Cleveland), is putting up a \$1-million facility at Mesa, Ariz., to produce solid propellants and solid-propellant engines for rockets. Rated capacity: 100,000 lbs./month, with plant startup slated for close to the beginning of the year.

Carbon Black: Phillips Petroleum Co. (Bartlesville, Okla.) has taken option on several tracts of land "about 100 miles from Houston" for possible construction of a multimillion-dollar carbon black plant. Exact locations were not disclosed, but one is said to be outside of Orange, Tex.—a 50-acre tract.

Liquid Gases: Union Carbide Corp.'s Linde Co. Division will add another link in its chain of liquid oxygen-nitrogen plants—this one to be located near the missile engine production facilities at Fort Crowder Reservation (Neosho, Mo.). Capacity: 135 tons/day of each.

Liquid Caustic Potash: Canadian Industries, Ltd. (Montreal), will build, at Cornwall, Ont., Canada's first unit for producing liquid caustic potash, according to General Manager J. D. Converse. Estimated cost: \$500,000. Completion is scheduled for mid-1960, with capacity "sufficient to meet present and foreseeable Canadian requirements."

COMPANIES

Consolidated Electronics Industries Corp. (New York) stockholders will vote Oct. 16 in Wilmington, Del., on a plan to consolidate the corporation with Philips Industries, Inc.—privately owned offspring of the Dutch-based N.V. Philips Gloeilampfabrieken—and Central Public Utility Corp. (New York). The merger would form a new electrical-electronics-phar-

maceutical company under the Consolidated Electronics Industries Corp. name. Listing would be sought on the New York Stock Exchange. Also proposed: formation by the new company of a separate, 66%-owned subsidiary. Into this organization, Consolidated would merge Philips Electronics Co., Anchor Serum Co., The Islands Gas and Electric Co. and Philips Roxane, Inc.

Swindell-Dressler Corp. (Pittsburgh)—CPI equipment builder—has been acquired by Pullman Inc. Directors of both firms said 110-year-old Swindell-Dressler would remain under leadership of William Cosgrove, chairman of the board, and H. I. Martin, president. Swindell-Dressler designs, engineers and constructs furnaces for metal and ceramics industries.

Borden Chemical Co. offices in Illiopolis, Ill., were destroyed last week when the F. E. Peters building, in which Borden has regional headquarters, was completely gutted by fire.

Texaco Inc. and **The Superior Oil Co.** have terminated merger negotiations. Augustus Long, Texaco board chairman, said that although the company's legal counsel felt the proposed merger would be entirely legal, the Justice Dept.'s Antitrust Division said it would begin proceedings if the companies merged.

FOREIGN

Chemicals/International: Esso Export Corp., overseas marketing arm of Standard Oil (N.J.), has set up a chemicals department to handle the growing chemical activities of Jersey Standard's foreign affiliates. Besides chemicals, the new organization will coordinate supplies of butyl rubber and lubricant additives to the affiliates, and provide sales assistance and technical sales service.

Chemicals/England: Imperial Chemical Industries rang up \$700 million in total sales during the first half of '59—\$50.4 million more than in first-half '58. Profits were \$56.6 million, compared with the previous period's \$38 million.

Investment/Germany: West German chemical industry's new capital investments totaled \$380 million last year, compared with \$350 million in each of the two previous years, a new industry survey reveals. Investments were equal to 8.7% of total sales in '57, 9.3% in '58.

World Chemical Exports: World chemical exports dropped by 1% in 1958, a recently published survey of the British Board of Trade shows. U.K. exports dropped 2%, while exports from the European continent were up 4%. This compares with the 2.7% drop in U.S. exports shown by Commerce Dept. figures.

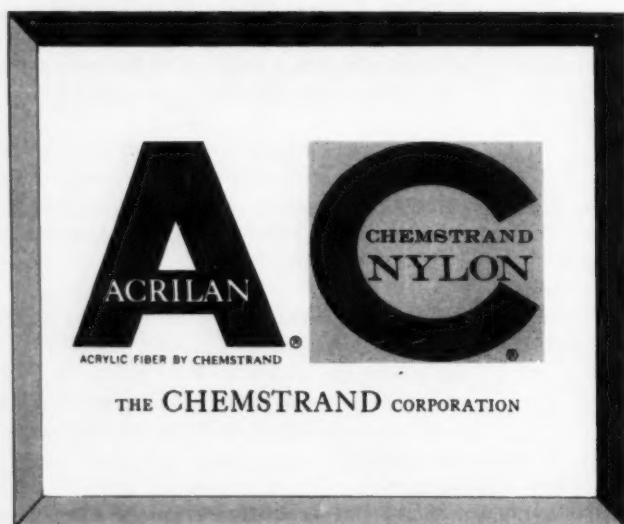


NORTH CAROLINA

Research from the Mountains to the Sea

American Enka Research Center near Asheville developed Tyrex viscose yarn. At the other end of North Carolina International Nickel concentrates its marine research around Wilmington.

NOW CHEMSTRAND . . . After 21 Location Studies



THE CHEMSTRAND CORPORATION, manufacturers of Acrilan acrylic fiber and Chemstrand nylon is locating its research facilities in North Carolina's Research Triangle, where the new Research Park is already mapped for nuclear, chemical, and industrial laboratories. A principal factor in Chemstrand's decision was the stimulating research climate already established in the Triangle, with its proximity to 900 scientists at State College, Duke University, and the University of North Carolina, and to the research staff of the new Research Triangle Institute.

Facilities located from the mountains to the sea enjoy accessibility and availability of the Research Triangle. For information in confidence write WM. P. SAUNDERS, Director, Department of Conservation and Development, Raleigh, North Carolina.

NORTH CAROLINA

Washington

Newsletter

CHEMICAL WEEK

October 10, 1959

Cobalt imports are not threatening the national security, the Office of Civil and Defense Mobilization has ruled. Rejecting a petition for higher tariffs and restrictive import quotas asked by Howe Sound Co., largest domestic cobalt producer, OCDM Director Leo Hoegh said steps to give the company a "protective umbrella" against import competition would cost U.S. cobalt consumers \$4 million/year.

What Howe Sound needs, according to Hoegh, is an increase in the price of cobalt from \$175 to \$230/lb. Domestic production, he noted, has been running less than one-fourth of imports.

With fluorspar producers' plea for more import protection now resting at Tariff Commission, the cobalt turndown leaves tungsten as the only mineral to be decided by OCDM under the so-called National Security Section 8 of the trade laws. A similar rejection of tungsten producers' pleas for tariff and quota protection is anticipated.

•
U.S. spending on scientific research should be increased sharply from the current \$10 billion/year (government and private) to \$36 billion/year by '76, Republican policy planners say. But the trend toward centralizing scientific work in federal labs should be reversed, says a report on science and technology.

The new GOP report, one of the first of a series designed to lay down a Republican image on issues of the future, contains no startling new proposals, and recommends no shifts in responsibility for U.S. research programs.

The report stresses need for increasing the educational effort but carefully avoids the question of federal aid. Other recommendations: maintenance of a strong patent system, allowance of adequate charges for overhead and management on government research contracts, continuation of the present federal Council for Science and Technology (rather than a Dept. of Science), rapid tax write-offs for basic research facilities, continued federal support for atomic development but private ownership for atomic power plants.

•
Rules on outside jobs by FDA officials will be made public any day. They are prompted by published criticism of a possible conflict of interest involving Henry Welch, director of FDA's Division of Antibiotics. He edits two journals that accept antibiotics advertising—antibiotics and chemotherapy, and antibiotic medicine and clinical therapy—but refuses to disclose how much he is paid. His dual role may figure in the Senate Antitrust Subcommittee probe of drug prices (*see page 36*).

•
Regulations banning 17 lipstick colors may never take effect. Those regulations, published this week, go into effect in 90 days. But an

Washington Newsletter

(Continued)

appeal by manufacturers will automatically postpone the deadline. Meanwhile, there is every reason to believe that color additives legislation will be enacted early next session to remedy the situation.

The colors were banned under existing law, which prevents use of a color even in minute amounts if it is harmful in large amounts. Legislation to permit establishment of permissible tolerances passed the Senate without a hearing. The House Commerce Committee will take a closer look but is expected to provide some similar form of relief.

•
The U.S. Supreme Court gets down to cases next week, now that opening ceremonies are out of the way. Scheduled for decision:

Parke, Davis & Co. pricing. The Justice Dept. wants to reverse a ruling that Parke, Davis merely exercised its right to select customers and did not engage in illegal price-fixing in marketing pharmaceutical products in Maryland, Virginia and the District of Columbia. The anti-truststers say Parke, Davis conspired with wholesalers and retailers to control prices in non-"fair-trade" areas.

State taxes. Phillips Chemical Co. says a Texas state tax on the full value of a government-owned plant it leases to make ammonia for commercial fertilizers is unconstitutional. Phillips claims the Texas tax is different from state use-taxes upheld recently by the Supreme Court in similar cases.

Pollution. The government is appealing a suit against three steel companies, charged with depositing solid wastes in the Calumet River near Chicago. Lower courts turned down government demands that the companies pay for dredging a river channel.

Other major cases may develop. There's a good chance that the Justice Dept. will ask the court to reverse Judge La Buy's ruling on Du Pont's stock holdings in GM (*see p. 33*). A decision during this busy court session would be highly unlikely.

•
A fresh source of long-term investment capital is opening up in Texas for smaller chemical and oil-gas companies. Texas financiers are giving a big play to the federal government's small-business investment company (SBIC) program.

While the program is moving ahead slowly in most other areas of the nation, three Texas companies have been set up in rapid order the past few months. Latest to open its doors is the Small Business Investment Corp. of Texas, with headquarters at Austin.

The company plans to concentrate its operations in central Texas, particularly in the Austin, Waco and San Antonio areas. It was organized with an initial capital of \$300,000, will stress financing of oil-gas and chemical companies.

Already operating in Texas are the Bankers SBIC of Dallas, composed of members of the Dallas Clearing House Assn., which will operate statewide, and the Texas Continental Investment Co. Inc.

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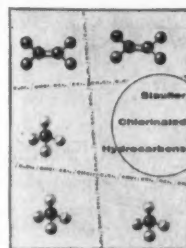
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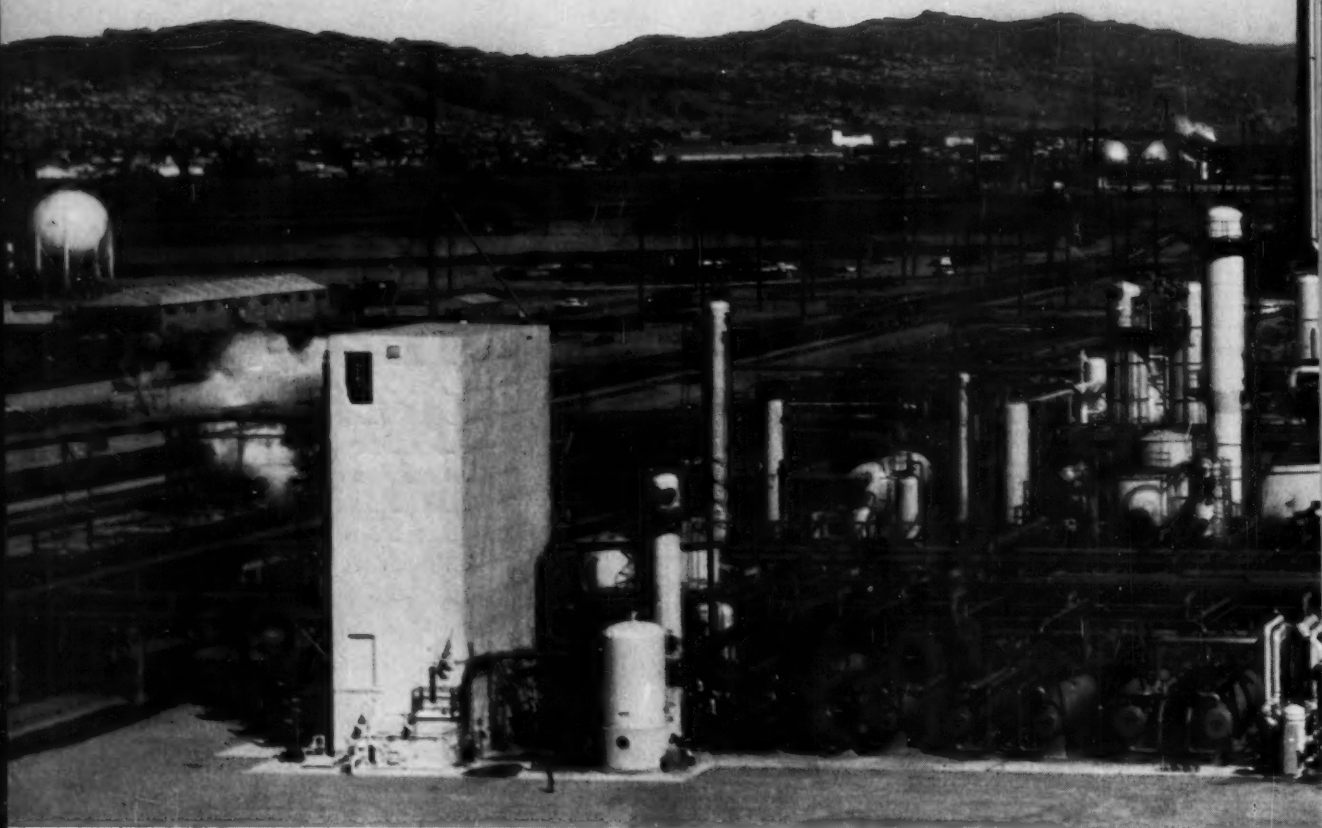
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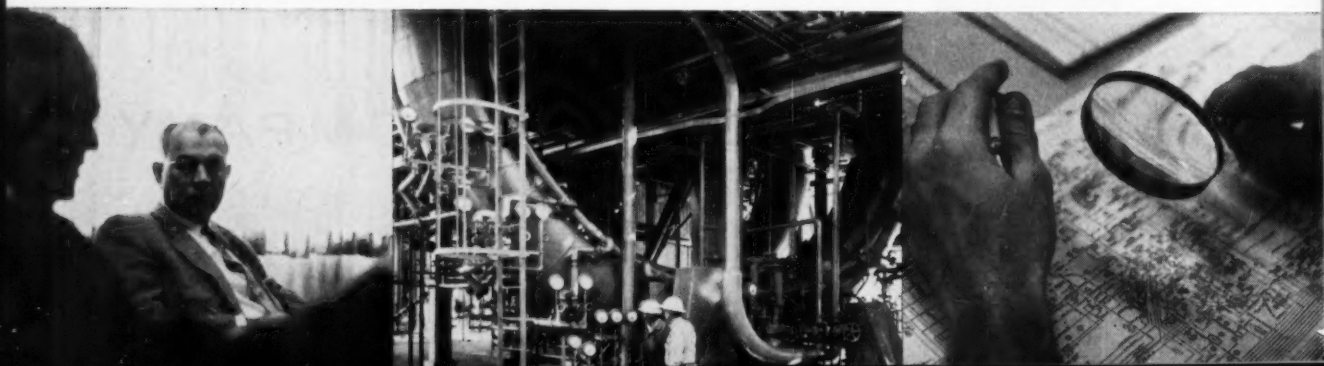
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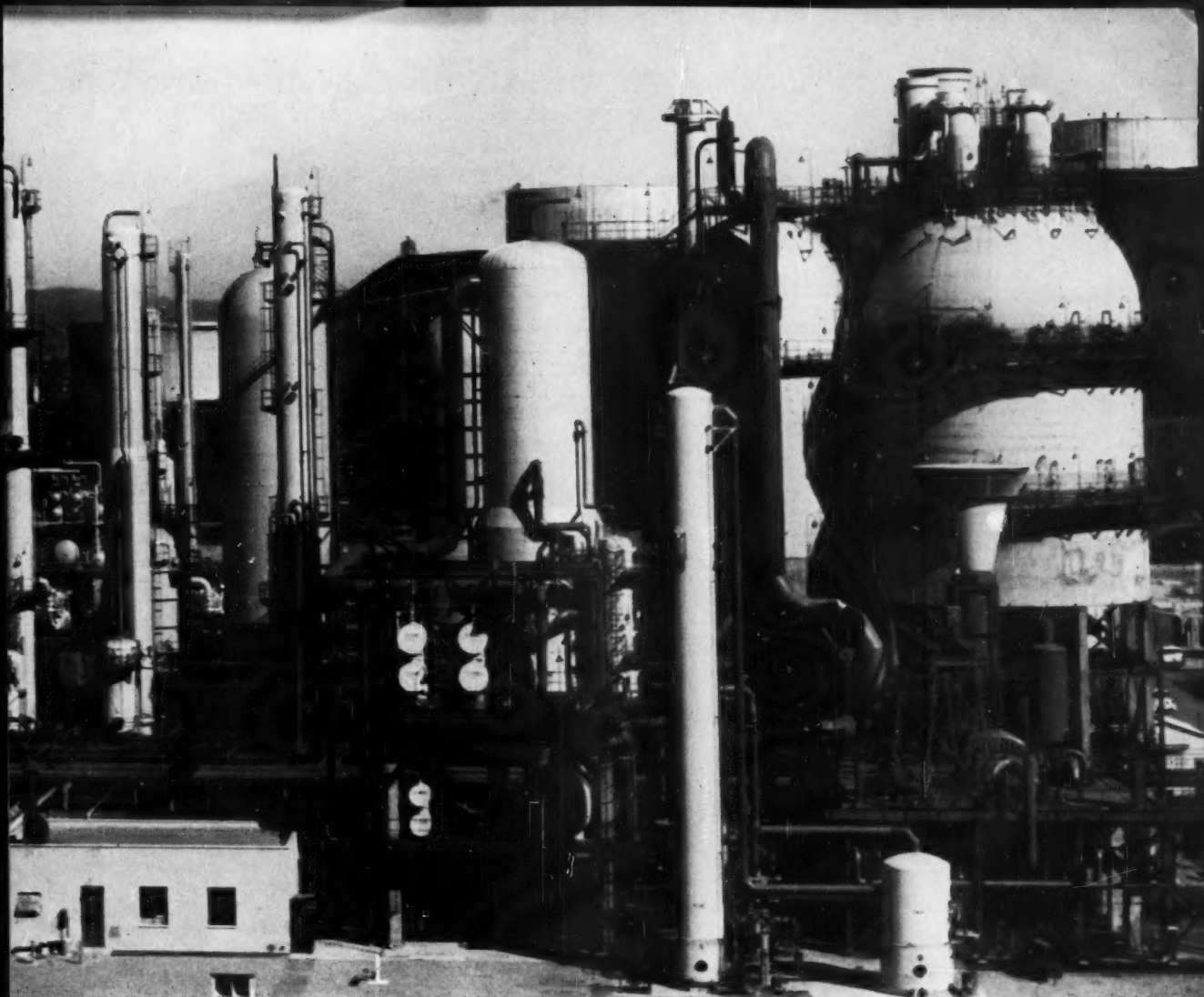


What's new in cat crackers?

The art of catalytic cracking has reached a highly advanced state. The improvements and refinements that now take place as new crackers are built seem minor indeed when one recalls the series of spectacular breakthroughs that followed one after another during cat-cracking's first eventful decade.

Yet there is drama even today. Sometimes it takes the form of a successful race against time. A record of sorts was set recently when the unit above was completed by Fluor for Standard Oil Company of California at its Richmond refinery on San Francisco Bay. It is an Esso Model IV





Fluid Catalytic Cracker with a capacity of 55,000 barrels per day, and it was delivered to the customer in time for the summer marketing season—two weeks less than one year after work began.

It is one of the two largest Model IV's in existence. The other, of the same capacity, was built by Fluor in 1954 for Standard at El Segundo. The Richmond and El Segundo units are almost identical except for auxiliaries (Richmond has a fired heater, a CO boiler and water-treating facilities). A few minor design and material changes, based on experience at El Segundo, were incorporated into the new unit.

The job was begun on June 2, 1958, and completed May 15, 1959. Credit for the fast completion is due to many factors—organization, planning, fine co-operation from customer and suppliers, and good luck. But perhaps the most important element of all was Fluor's broad experience in the design, engineering and construction of cat crackers—nearly thirty of them since 1940.

A Fluor brochure, "FCC at Richmond," describes this interesting unit. Write to Dept. 91, The Fluor Corporation, Ltd., 2500 South Atlantic Boulevard, Los Angeles 22, California.

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SPECIALTIES



CW PHOTO—B. CLINKSCALES

PRC's top management* discuss market possibilities of the company's newly developed joint sealant.

Building a Business on Offbeat Specialties

This month a brand-new one-part synthetic rubber caulking compound will be introduced to the construction industry. The new material—designed to replace hard-to-handle refrigerated and two-part systems now being used in building construction—is the latest item from Products Research Corp. (Los Angeles), a young organization, formed to exploit generally overlooked industrial specialties ideas.

Products Research is happily watching its sales curve climb along with those of three of the industries it serves—aircraft, electronics and construction—for which it makes a line of caulking, sealing, coating and potting compounds.

Developing products for the military as well as for industry, PRC gets a good share of Air Force R&D con-

tracts. It is now working on one to develop higher-temperature fuel-tank sealants that can be used with either conventional hydrocarbons or any of the high-energy fuels now being investigated.

Accent on Research: The Air Force order reflects one of the reasons why the 14-year-old company is riding high: its strong emphasis on research. Its research budget the past three years totaled approximately \$650,000. The '59 figure is \$250,000—with sales totaling only \$5 million/year.

To add to its current domestic sales of \$4 million/year, the company is expanding its foreign business, now amounting to nearly \$1 million. Recently negotiated working agreements with British Paints, Ltd. (Newcastle upon Tyne, England), and Le Joint Français (Bezons, France) are expected to triple sales in the "Common

Market" countries. Similar success is hoped for in a deal under way with a Japanese firm.

Feminine Founder: PRC was founded in '45 by its present board chairman, Kay Willett Schien, then in her mid-20s. At that time, she was assistant to the late James Schien, aircraft industry sales manager for Sherwin-Williams. They often talked about industrial products' never being offered because there was no organization to determine marketability and to follow up with a product offering.

Miss Willett decided she was just the person to start such a company. With \$6,000 in working capital raised with three associates, including her husband-to-be, she opened her business in Los Angeles.

The company's first product was Chromelock, an impregnated felt tape to help shipbuilders solve caulking

* George Gregory, President; Gordon Bradford, Sr., Secretary-Treasurer; and Mrs. Kay Schien, Board Chairman.



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SPECIALTIES

problems created by a rubber shortage.

That product—basically, felt impregnated with a resin—is still being made in a specialized form using chlorinated biphenyls and petroleum resins. Newest use: acoustical control in nuclear subs.

Though Products Research was conceived as a testing and marketing operation, it soon embarked on manufacturing. In '48, the company decided to develop its own products. It issued about \$50,000 worth of additional stock and hired a technical director, George Gregory, who was a chemist specializing in sealants. James Schien was named president, a position Mrs. Schien took over after his death.

Soon, PRC was producing a Thiokol-based sealant and had acquired patents on curing processes used in the application of this product. The firm now uses a battery of raw materials: Thiokol liquid polymer, polyurethane, room temperature-vulcanizing silicones, modified and straight epoxies, fluoroelastomers, chlorinated biphenyls, and petroleum resins.

Expanding Product Line: About five years ago, the company's executives realized that their concentration on a single product for the fast-changing aircraft industry might leave them open to possible technological obsolescence, as well as to economic ups-and-downs occurring in the aircraft industry.

Rubber Calk—their first nonaircraft product—appeared on the market at an opportune time: architects and engineers had just begun to adopt metal curtain walls, in which the entire exterior of a building is made of prefabricated panels requiring a weatherproof sealing material in addition to mechanical fastening.

Currently, PRC also produces sealants for the optical, electrical, marine, industrial and construction fields. Its sealant prices cover a wide range: a nonsetting wing tank sealant, used for some of the supersonic fighters, can be produced in quantity at \$60/gal. Topping the list is a fluorinated silicone groove sealant that sells at \$1,600/gal. (PRC has yet to make money on this product, however.)

The company now has plants in Burbank and Glendale, Calif., and

Gloucester City, N.J.; warehouses in Dallas, Seattle and Chicago; regional offices in major cities, and about 25 salesmen, plus a number of manufacturers' representatives and distributors.

To Buy or Not to Buy: Today this closed corporation (about 34 stockholders) is worth over \$5 million, and it's enthusiastically looking to the future. Its new president, George Gregory, says that about once a month somebody tries to buy or merge with PRC. The company itself has considered buying outside of its present field, but only where there's a strong link—e.g., electronics companies.

If it decides to buy, the move will be in accordance with Gregory's principles: (1) don't buy competitors and (2) buy to increase total capabilities. He says PRC isn't going to buy another company merely for the sake of increasing its size of operations. Its management believes that growth also takes place through intensified research and proprietary product development.

Latex Upgrader

National Starch and Chemical Corp. (New York) has come up with a new solution to paint formulators' problem of using zinc oxide in exterior latex paints (to improve tint retention and mildew resistance) without getting package instability as a by-product. Its answer: National Resyn 25-2243. A polyvinyl-acrylic copolymer, it is especially designed for use with zinc oxide in exterior paints.

Studies conducted in cooperation with American Zinc Institute show that the package stability of zinc oxide-containing paints made from the new resin is good after 12 months' storage. Consistency changes in the zinc oxide paint are nominal and show an average variation of 4 K.U. (Krebs Units).

Freeze-thaw tests indicate that the paint can withstand three freeze-thaw cycles at 15 F and still retain stability. Currently under way are exposure tests at nine locations in the U.S. Durability of both white and tinted paints on asbestos-cement shingles, stucco, cedar shingles, yellow pine siding, and chalking house paint are being studied, but weathering results aren't yet available.

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Thousands of noses twitched—and each one signaled the loss of a repeat sale for a major stencil producer.

The problem, several years ago, was simply oleic acid rancidity. The firm tried another oleic acid. And another.

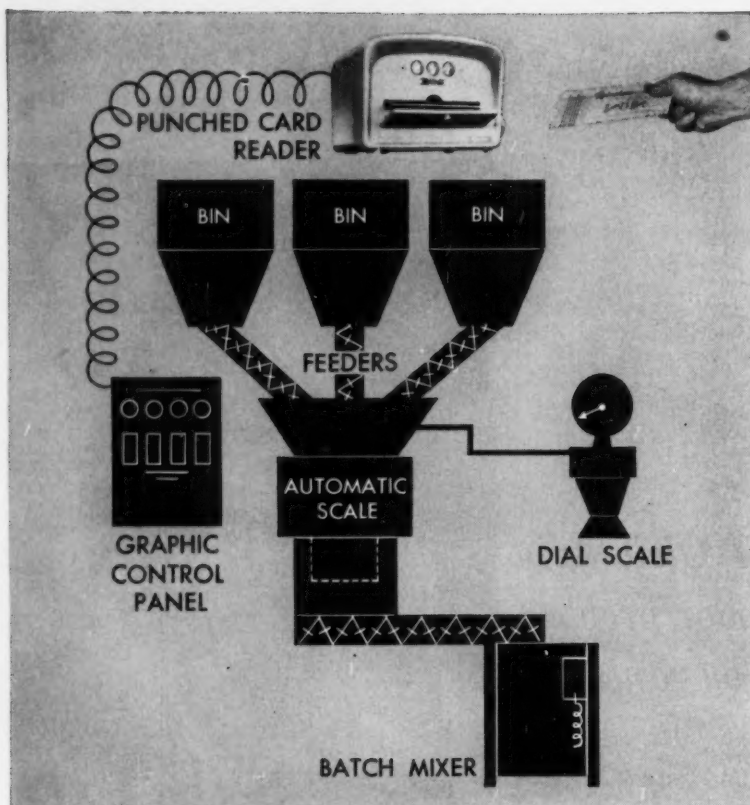
Finally, Emersol 233 LL Elaine.
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So they switched to buying Emersol 233 exclusively. And, their subsequent checks on a host of competitive oleic acids have borne out their earlier judgment—Emersol 233, with a polyunsaturate content of less than 5%, has far greater resistance to rancidity than any other oleic on the market.

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PATENTS

These recently issued patents were of interest to makers and marketers of chemical specialties.

• U.S. 2,900,291 assigned to Armour & Co. (Chicago) describes a method of upgrading animal glues. In this process, animal glue is esterified with an alkylene oxide (e.g., ethylene oxide) to provide reduced gelling temperature, increased water solubility and appreciable solubility in polar solvents.

• U.S. 2,899,278 assigned to Du Pont describes pigment production of titanium dioxide by vapor-phase oxidation of titanium tetrachloride. Until a few years ago, all commercial titanium dioxide was obtained by treatment of titaniferous ores. Then Du Pont brought out a chloride-process titanium dioxide that had improved dispersibility, whiteness and durability (compared with other rutile grades). Competitive manufacturers (Titanium Pigments Corp., American Cyanamid, Glidden, and New Jersey Zinc) now have a better picture of what is involved in the process.

Aerosol Clinic

A technical clinic designed to provide basic and up-to-date information on pressure filling will be sponsored this month by the Chemical Specialties Manufacturers Assn. (50 East 41st St., New York).

The clinic will meet in New York at the Sheraton-McAlpin Hotel Oct. 17 and in Chicago at the LaSalle Hotel on Oct. 24.

The all-day session at each city will cover such items as formulation problems, handling customer complaints, and filling methods.

Registration before Oct. 10 for the New York meeting and Oct. 17 for the Chicago meeting costs \$10. It will cost \$12 for registration at the time of the clinics. H. W. Hamilton of CSMA is handling registration.

PRODUCTS

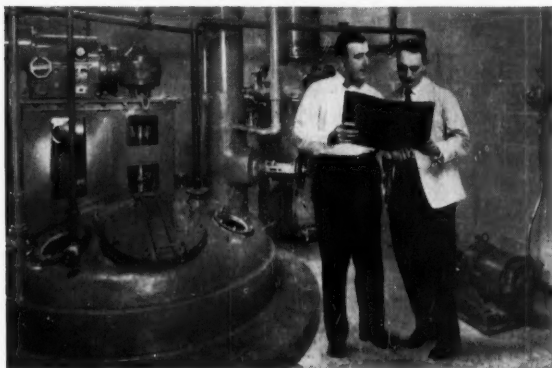
Dye Products: Emkay Chemical Co. (319-325 Second St., Elizabeth, N.J.) has developed two new products for dyers of polyester and triacetate fabrics. Emkalar Base E-55 is an emulsifier with which the dye plant can make its own carrier. Emkalar 527 is a prepared carrier, de-

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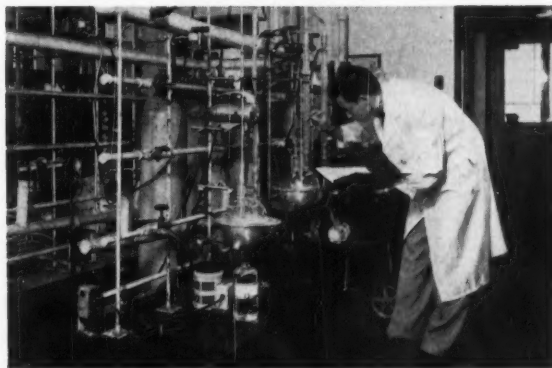
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scribed as a liquid dispersion of *o*-phenyl phenol.

Phosphating Compound: Turco Products, Inc. (24600 South Main St., Wilmington, Calif.) has come out with a low-temperature phosphating compound, Turcoat Low Temp, said to operate at temperatures 75 F lower than do conventional processes. It can be applied by immersion or spray washer.

High-Speed Sealer: PMC Industries (293 Hudson St., Hackensack, N.J.) claims to have an improved method of applying metal aerosol valves to glass containers. A wrinkle-free finish reportedly is produced when operating at speeds in excess of 200 containers/minute.

Zinc Coating: Amercoat Corp. (4809 Firestone Blvd., South Gate, Calif.) is marketing an inorganic zinc coating, Zinkote, said to save 50% in application time. The product cures to full hardness without a separate curing solution, can be applied over bare steel by brush, spray or roller, and is claimed to have excellent adhesion.

Disposable Inker: J. L. Ferguson Co. (Joliet, Ill.) will replace felt inkers on its Packomatic imprinting machines with a disposable inker employing the new microporous Porelon resin. Porelon is a product of S. E. Johnson & Sons Co. (Racine, Wis.). The new inker is said to be inexpensive, and to eliminate the need for ink reservoirs.

Chelating Agent: Tanatex Chemical Corp. (Kearny, N.J.) has introduced Plexene XX, an aqueous solution of an organic sequestering agent for chelating ferric iron. It's also effective with calcium, magnesium, copper and other di- and tri-valent metals and has application in textile and paper industries.

Acid Inhibitor: Enthone, Inc. (New Haven, Conn.), has developed an odorless form of its liquid Inhibitor 11, for acids. Hydrocarbon odor, it is said, has been eliminated without diminishing the inhibiting properties of the product. It is used at a concentration of 1 gal./500 gal. of pickling solution for steel and copper.

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EQUIPMENT

Arc image furnace—popular for producing high temperatures in research work—offers new way to grow single-crystal semiconductors.

REFRACTORIES

High-melting metals are progressing toward structural use in missiles and aircraft, thanks to advances in extraction, alloying, fabrication.

Nonmetallics are being groomed for new uses in high-temperature processing equipment (e.g., pumps for handling molten metals).

PROCESSES

Pyrometallurgy—capitalizing on oxygen enrichment, inert-gas blanketing, fluid beds and reduction by reactive metals—bids for new jobs in rare-metals production and nuclear fuel reprocessing.

Chemical synthesis above 3000 K offers intriguing new materials. **Needed:** answers on energy costs, kinetics, commercial incentive.

Research Bears Down on Heat Barrier

About 750 scientists and engineers are meeting this week to review the rapid progress being made in fundamental research and commercial applications of new high-temperature materials and processing techniques. It's their second international symposium on high-temperature technology, sponsored by Stanford Research Institute at the Asilomar conference grounds on California's Monterey Peninsula.

Much has happened since the group first met three years ago in Berkeley, Calif. Spurred by the space-age needs for high-temperature materials of construction to withstand unprecedented operating conditions, scientists and engineers have been pioneering in many unexplored areas of the high-temperature field.

At the symposium, several speakers are presenting comprehensive summaries that correlate newer developments with familiar materials and processing techniques. Upshot: clues to probable commercial applications.

To simplify the conferees' task of assimilating the wide variety of subjects on the program, the meeting schedule provides them with free time in the afternoon for relaxation and recreation in the rustic setting of Asilomar. Complete proceedings

were distributed in advance to each member.

Equipment, Processes: Most of the discussions scheduled for the opening session Wednesday morning deal with the experimental apparatus and techniques employed in the fundamental studies of high-temperature phenomena.

C. P. Butler, of the Naval Radiological Defense Laboratory, is scheduled to describe the arc image furnace—a relatively new tool for measuring the properties and studying the behavior of materials at high temperatures. The image furnace is basically a radiant-energy collector (the solar furnace is a special case) employing a system of optical mirrors to concentrate the radiant energy of an arc (or, in the case of the solar furnace, the energy of the sun) onto a single plane.

This research tool has been used to study ignition of solid propellents, and to measure the thermal diffusivity and specific heat of metals at high temperatures. A potentially commercial use of the image furnace is suggested by SRI's successful attempts to grow single-crystal semiconductors.

In this process, the image furnace was employed to focus the energy of an arc at the point where powdered

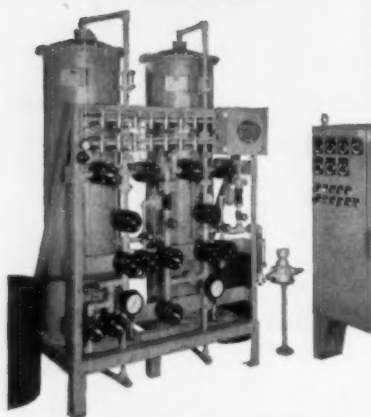
refractory compounds entered a modified Verneuil furnace. The powder was directed onto the molten surface by the downward flow of an inert gas, which also served as an inert blanket. This technique should permit the growing of many crystals, which would decompose or vary in stoichiometry under normal heating conditions, says Butler.

In addition to heat transfer studies, future applications of the image furnace are expected to supply important answers about photochemical kinetics of liquids and gases.

At the Wednesday evening session, Battelle Memorial Institute's Robert Jaffee is scheduled to summarize the status and the likely outlook for refractory metals (those that melt at or above 1875 C, the melting point of chromium). The chief impetus behind the rapid development of refractory metals in recent years, says Jaffee, is the need for structural materials to withstand temperatures of 1100 C and above, encountered by advanced aircraft and space vehicles.

Currently, most refractory metals (hafnium is an exception) are in plentiful supply or have abundant, exploitable reserves. Common metals, such as chromium, vanadium, columbium, molybdenum and tungsten,

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are currently available, or could be produced, in quantities of 25-50,000 tons/year. Estimates of potentials for other refractory metals: tantalum production could be boosted from the present annual rate of about 400-500,000 lbs. to 1-1.5 million lbs.; hafnium is tied to zirconium production, could reach 50-100,000 lbs./year; scarce rhenium capacity — now about 1,000-2,000 lbs./year — could go to 10-20,000 lbs. The platinum group of refractory metals isn't likely to be expanded much beyond the present 3,000-lbs./year production rate, can be considered only for limited applications.

In many instances, says Jaffee, stepping up production of refractory metals calls for improved beneficiating and extraction processes. Columbium, for example, now comes mostly from Nigerian or Australian columbite ores. And while these sources could be expanded to perhaps 5-10 times current output, the truly vast reserves of this metal lie in pyrochlores, in which the columbium values are finely disseminated. To successfully exploit these low-grade sources, industry's process transition must simulate that used to switch from rich rutile ores to low-grade ilmenite in titanium production.

In the processing area, Jaffee pegs improved extraction equipment and techniques as the key to higher purity, which, in turn, is the key to ductility of the products. Hottest development in the consolidation of the purified refractory metals is electron-beam melting. One disadvantage: it is not suitable for alloying elements that are too volatile at the temperatures and vacuums required for electron-beam operation. Jaffee predicts that powder metallurgy and arc melting will continue as the two major routes to consolidation of refractory metals, but adds that the electron-beam process "looks as if it will become an important process of the future."

Among the current developments worth watching: the use of alloying ingredients to improve the high-temperature strength of the refractory metals. A number of proprietary alloys (e.g., General Electric's F series, and others by Du Pont, Union Carbide Metals and Kennecott) show promise of things to come in columbium alloys, says Jaffee.

Nonmetallics: A summary by MIT's

W. D. Kingery emphasizes the need for improving the thermal-shock and impact resistance of oxide materials to extend their use in high-temperature containers, structural parts and thermal insulation. Key: improved control of composition and structure by better fabrication techniques.

Focusing on some specific new developments in graphite, carbide, nitride and sulfide refractories, National Carbon Co.'s L. M. Litz cites the development of antioxidation coatings for graphite as one of the most important goals of current research. Reason: reduced permeability of graphite to gases and fluids is vital in certain types of chemical processing applications and in gas-cooled nuclear reactors.

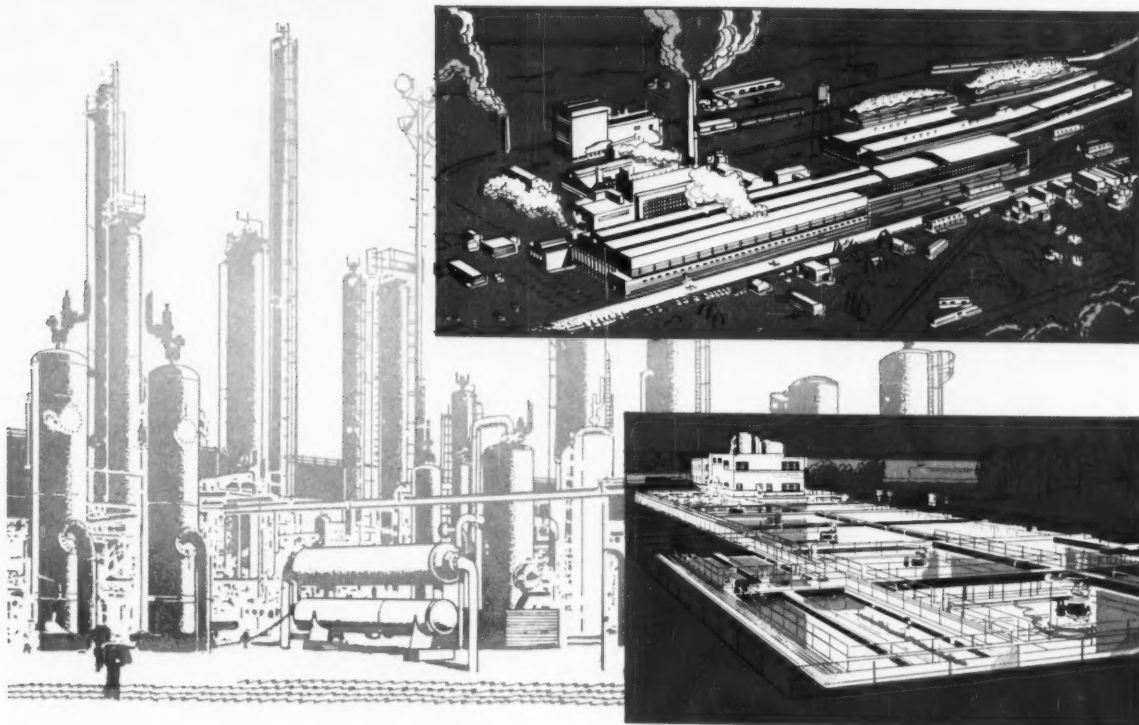
Progress has been made, says Litz, both by impregnating techniques and by pressure baking—a recently developed process that produces more uniform, finer-grained graphite. Some effective impregnating techniques involve treating the graphite after initial graphitizing with furfuryl alcohol and a polymerization catalyst. The resulting resin is then carbonized by regraphitizing the material.

Pyrolytic carbon — i.e., carbon formed by the pyrolysis of a gaseous hydrocarbon — is also proving to be useful, says Litz. As an impregnating material, it effectively reduces the permeability of graphite; as a coating for carbon containers, it doesn't react with oxygen as readily as conventional graphite, and can withstand the penetration of silicon vapor during the sublimation of silicon carbide.

Another important development now in the works is refractory-coated graphite. Most promising: silicon-containing compounds, such as silicon carbide and silicon nitride. Minnesota Mining and Manufacturing Co. has developed a siliconized-silicon carbide coating that may also find use as a bonding agent.

An alternate coating approach described by Litz is the formation of refractory metal carbide coatings on the inner surface of graphite tubes. In this technique, the coating is applied by controlled decomposition of metal chlorides at temperature and pressure conditions that cause the carbide, rather than the metal, to be formed. Columbium, zirconium and tantalum coatings have been applied in this way. Among the promising de-

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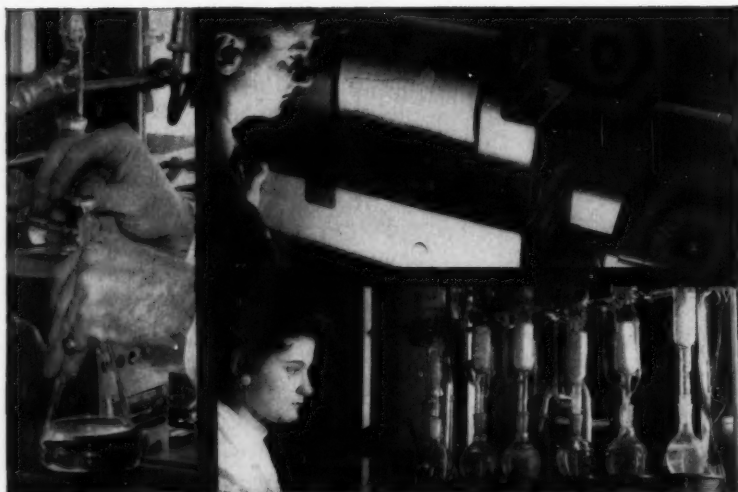
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velopments now being reported in this category: a three-layer coating of molybdenum, aluminum and silicon, by National Research Corp.; an electrophoretic process, by Vitro Corp. of America, for depositing carbide, silicide or metal alloy coatings.

In addition to increasing its usefulness in conventional roles, graphite may find its way into a number of new high-temperature applications in the form of cloth. National Carbon's new line of flexible graphite fiber, felt and fabrics has a major potential, says Litz, as reinforcing material for plastics, ceramics and refractories in such high-temperature uses as rocket nozzles and nose cones.

A new approach to watch in silicon carbide refractories, says Litz, is self-bonded materials. Recent work in this area has yielded silicon carbide with four times the flexural strength and modulus of elasticity of the more conventional nitride- or ceramic-bonded materials at room temperature. Moreover, the self-bonded refractory retains these advantageous properties to an even greater extent at elevated temperatures.

Developments to watch: addition of graphite granules to boost the shock resistance of silicon carbide by absorbing uneven expansion stresses; foamed silicon carbide for thermal insulation at temperatures to 2200 C.

Other superrefractories with potential for industrial uses:

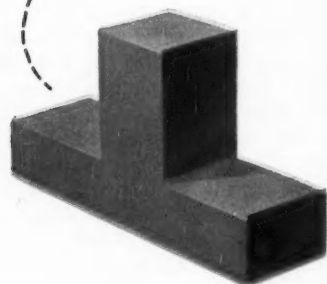
- Sintered carbides of titanium, zirconium, tantalum and columbium have been developed for use as lead-ins to the aluminum cathode of Hall cells in the fused-salt electrolysis of aluminum.

- Uranium carbide is attracting increasing attention for high-temperature nuclear reactors, provides a higher concentration of uranium than uranium dioxide, which is also competing for this use.

- Cermets of tungsten and titanium carbide show excellent resistance to wear in pumps used for handling molten sodium and sodium-potassium alloy at 1050 C, may find even wider application as new fabricating techniques, such as flame-spraying, are developed.

A roundup of silicides, borides, aluminides, intermetallics and other unique refractories by GE's J. H. Westbrook describes considerable research on these materials, but little

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likelihood that they will find wide use as bulk materials. Most practical, to date, says Westbrook, is zirconium boride. Its high melting point, corrosion resistance and wear characteristics make it attractive for burner systems and rocket nozzles. And since it is not wetted by many commercially important metals, it's potentially useful for liquid metal pumps, spray nozzles and thermocouples.

High-Temperature Processes: On Thursday the conferees are turning their attention to high-temperature processing techniques. Lead-off topic at this session is high-pressure methods, presented by H. Tracy Hall of Brigham Young University (formerly with GE, Hall developed that company's highly secret process of making synthetic diamonds). One of the high-pressure techniques discussed by Hall is reportedly capable of making diamonds, though there's no indication that it figures in the commercial process employed by GE.

The much-discussed field of fused-salt chemistry is covered in a thoroughgoing "state of the art" report by George Janz of Rensselaer Polytechnic Institute. Fused salts are of increasing importance in many areas of high-temperature technology, says Janz. But much exploratory work and exact experimental study is needed to establish this field on a firm fundamental basis.

Delving into one of the oldest types of high-temperature processing, H. H. Kellogg, professor of Mineral Engineering at Columbia University, points up the trends in pyrometallurgy. There has been a resurgence in pyrometallurgical processes since World War II, sparked by the need for new metals—titanium, zirconium, columbium, uranium—for which no prior art existed. As a result, says Kellogg, this field is typical of rapidly moving technology.

A general theme underlying many of the significant process developments is the liberal use of oxygen, vacuum, inert-gas blanketing and active metal-reducing agents, such as sodium and magnesium. These processing aids were previously avoided because of their high cost, but today they are cheap or at least justified by the high value of the products. Another important factor, says Kellogg, is the growing use of fluid-bed reactors for gas-solid reactions. Here



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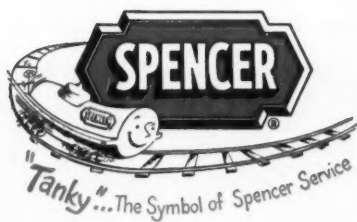
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are some of the extractive processing techniques utilizing these new developments:

- Halide reduction with sodium and magnesium seems to have a secure future for reactive metal production. Progress in titanium extraction, for example, has cut the cost of the metal from \$5/lb. a few years ago to \$1.62/lb. And with growing volume, Kellogg predicts, it could be shaved to the \$1-1.25/lb. range.

- Electrowinning from fused salts—long the standard process in aluminum, magnesium and sodium production—shows promise in processing reactive metals. However, major improvements are needed to overcome the problem of blanketing. Since metal is deposited at the cathode as unconsolidated crystals, an inert atmosphere of argon or helium is required, makes it difficult to design continuous, or even large-batch, operations.

- Vacuum retorting of calcined dolomite with ferrosilicon for the production of magnesium was dropped by U.S. users because of high costs. However, it produces a purer grade of magnesium than electrolysis and is still used by Dominion Magnesium of Canada, which claims to have achieved competitive costs. A new vacuum retort plant is planned for the U.S. and Kellogg predicts "we haven't seen the last of this process."

- Zinc blast furnace development was stymied for a long time by the high volatility of zinc and the ease with which it reoxidizes in carbon dioxide. A new furnace developed by Imperial Smelting Corp. (Avonmouth, England) appears to have solved these problems. The key: removing the hot gas (6% zinc, 11% carbon dioxide, 18% carbon monoxide, 65% nitrogen) from the middle of the furnace shaft and shock cooling it from 1000 C to 550 C by a shower of hot lead. This system still faces stiff competition for the processing of ordinary zinc concentrate, says Kellogg. But if it will work on bulk lead-zinc concentrates that can't be separated by selective flotation, its future will be assured.

- Flash smelting of copper or nickel sulfide concentrates seems a natural and overdue development for matte smelting, says Kellogg. In this process, the powdered sulfide minerals are mixed with air or oxygen

and injected into a combustion chamber. Flash combustion of the sulfides yields molten, partly oxidized particles that fall to the hearth of the furnace to form a liquid matte and slag. By utilizing oxygen in place of air, International Nickel reduces heat requirements so that external fuel isn't required, obtains a rich (85%) sulfur dioxide gas that can be cleaned, liquefied and sold to nearby pulp and paper plants.

- Fluid-bed processing affords important advantages in control, uniformity of temperature and gas composition within the bed, and highly efficient mass and heat transfer from gas to solids. Most new installations for roasting of sulfide and arsenide ores, chlorination of oxide ores, and calcination of carbonates are turning to fluid beds. An especially promising application, says Kellogg, is the direct reduction of iron, though it's unlikely that this technique will replace use of blast furnaces in the U.S. But it is adaptable to smaller-scale production than the blast furnace requires for optimum economy and may find immediate application in many foreign areas where coking coals are scarce.

In the area of high-temperature refining processes, Kellogg looks for vacuum melting to win more jobs as demand for premium-quality metals grows. Electron-beam melting is now restricted to small-scale melting of high-price metals because of high costs (\$2-11/lb.). Despite this limitation, however, electron-beam techniques will likely find increasing utility, he predicts, as experience in its applications lowers the operating cost.

Two other high-temperature refining methods—zone and gas-phase—seem definitely limited to laboratory work or small-volume, high-value products. Zone refining must be adapted to continuous operation, says Kellogg, before it can be considered for large-scale applications.

Fused-salt electrorefining, using a soluble anode of crude metal to deposit pure metal on the cathode, affords unusually high refining ratios for a single-stage operation, plus high current efficiency and reasonably low cost. Says Kellogg: producers of pure metals would do well to pay more attention to the fused-salt technique.

Steelmaking developments have

been highlighted by the increasing use of oxygen, both here and abroad. The significance of progress in this area is apparent in the prediction that the L-D oxygen process may account for 25% of all U.S. steelmaking capacity within the next six years.

Kellogg predicts that pyrometallurgical processing should be a strong contender in nuclear fuel reprocessing. Its advantages for this use: metallic fuels can be refined without the added steps of putting them into solution and later reconverting the purified salts into metal; waste fission products are obtained in dry, concentrated form; since shorter cooling (radioactive decay) time is needed, inventories can be reduced; expensive alloying agents (e.g., zirconium, columbium) can be recovered; critical mass control is less severe than it is in aqueous processing systems; compact size of pyrometallurgical plant permits on-site location, eliminates shipping costs.

Capping the high-temperature process session is a roundup of chemical synthesis considerations by SRI's Russell Phillips and Alan Ferguson. By limiting the discussion to reactions occurring above 3000 K (2727 C), this presentation eliminates all but a few commercial processing techniques (such as electric-arc processing). The problems—and some possible solutions—of operating above this range:

- Materials of construction are unavailable; conventional reactors must be replaced with "imaginative designs."

- Fossil fuels provide maximum temperatures of about 2500 C; other sources of thermal energy are too expensive. This factor will become less important as arc efficiencies improve and the cost gap between fossil fuel and electric power is narrowed.

- Chemical compositions can't be "frozen" at the equilibria existing at the high temperature, require the development of new cooling principles.

- Fundamental high-temperature data, especially on reaction kinetics, are almost nonexistent.

- Financial incentive for high-temperature research is lacking, but this factor could change as pioneering developments open the door to new materials with sufficient potential to warrant stepped-up research and development.

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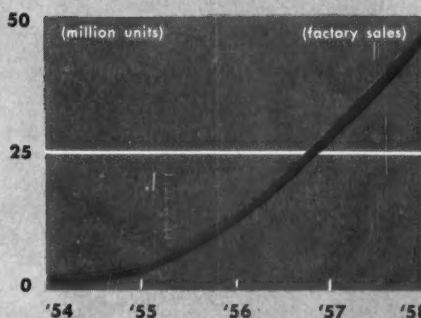
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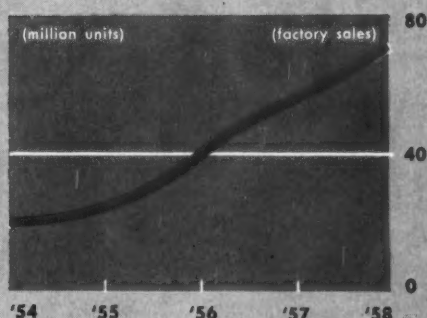
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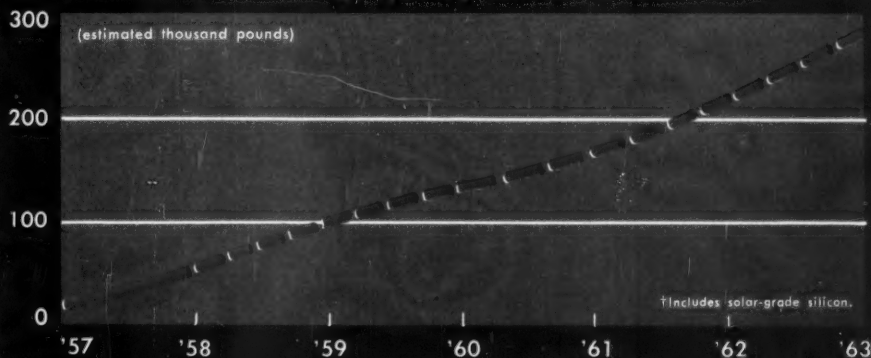


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Silicon Poser: Is Purity Worth the Premium?

In the past few days, two knotty problems were thrust before U.S. silicon producers. First came the unsettling allegation that they are over-emphasizing importance (in electronics) of extreme-high-purity (CW Market Newsletter, Sept. 19). Next came complaints from U.S. electronics makers—prime silicon customers—that Japanese exports of semiconductor devices pose a serious threat to their industry and national security.

These problems come at a time when U.S. high-purity-silicon makers feel that the industry's growth was easily foreseeable—and likely to be large (see charts). Basis for this optimism: brisk current sales of transistors, diodes and rectifiers.

The complacency-jolting prediction

of a changing silicon demand pattern came from Aries Associates, CPI consultants in Stamford, Conn. Citing a recently completed, exhaustive "white paper" on the silicon business, Aries hints of substantial evidence—coming "from all U.S. users of semiconductor materials"—that apparently leads to only one conclusion: consuming industries will swing increasingly to use of lower (and considerably less costly) grades of silicon.

The result might seriously hurt producers who now are putting considerable amounts of money into research, development and plant building—all tied to extreme-purity materials.

High Purity Paves the Way: Aries

agrees that highest-grade silicon was essential in early stages of semiconductor development. Then, physical properties were being studied and production methods were being developed, explains Aries. But now, since the industry has acquired the necessary technical information, he says, it can turn to use of lower-grade materials, provided the less expensive forms are reliably consistent in their physical properties.

Relative price of various grades of silicon reflects the degree of processing required, shows what silicon users can gain by a shift to use of lower grades.

Grade 1 silicon now sells for \$330/-lb.; Grade 2, \$220/lb.; Grade 3, \$130/lb. (A fourth grade used mainly

Du Pont DMF

DIMETHYLFORMAMIDE

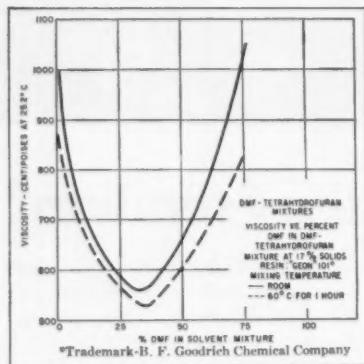
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In many cases, the advantages of Du Pont dimethylformamide (DMF) as a booster solvent are: (1) more economical formulations, (2) higher solids content at a given viscosity, (3) higher gel point, (4) and it makes possible use of the highest molecular weight polyvinyl chloride resins for coatings.

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APPLICATIONS of Du Pont DMF as a resin solvent include top coatings, adhesives, films, and printing inks. For protective coatings, DMF's powerful solvent effect allows use of high resin content solutions giving thicker coatings in roller or spray applications. The medium-range boiling point of DMF suggests its use in baked-on coatings.



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in manufacture of solar cells—but not pure enough for many electronics uses—costs \$90/lb.)

Partial Agreement: U.S. firms now striving to make ultrapure silicon aren't all ready to accept the Aries forecast at face value. Monsanto, for example, will go right ahead and complete the high-purity silicon plant it's building near St. Louis, Mo. (due on-stream in '60). Monsanto silicon experts, like many others in the industry, are confident there will continue to be substantial demands for the purest grades of silicon.

A spokesman for Foote Mineral echoes this optimistic opinion (Foote has sporadically been making silicon on pilot-plant scale since early '59): the firm will continue to try making material of "the highest possible purity," although it admits that Aries is right in predicting a swing to use of lower grades.

Reason: many applications require only lower-grade silicon (or germanium), but other uses—particularly rectifiers—call for use of the best available grades.

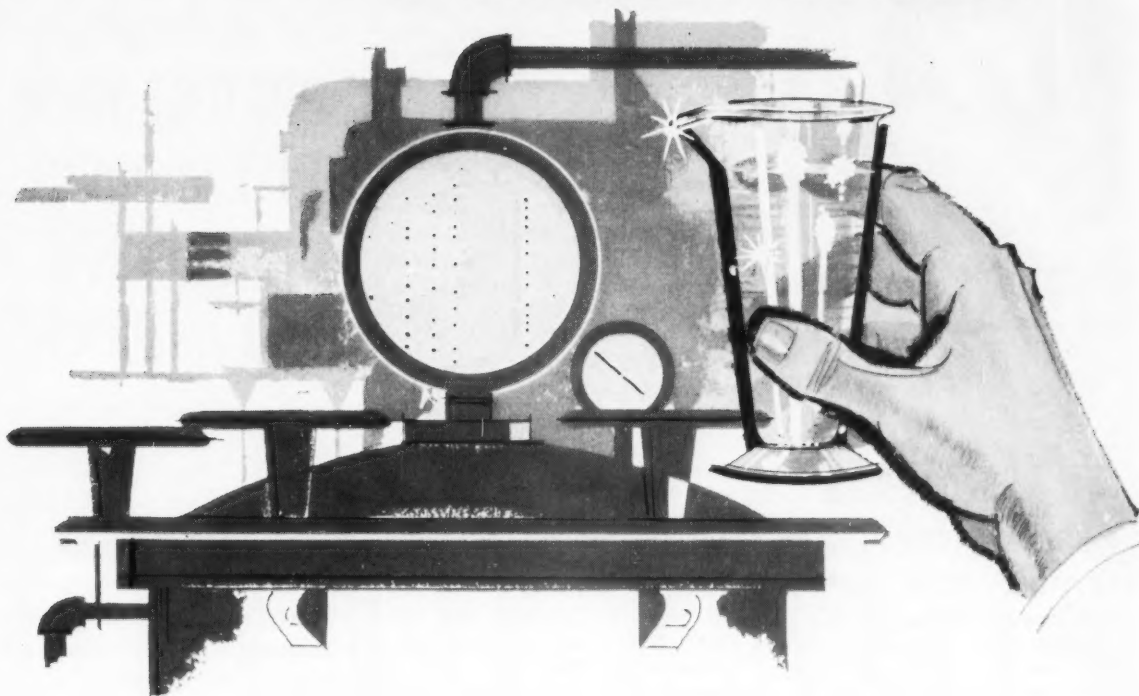
Others now making ultrapure silicon: International Metalloids and Merck; Dow Corning and Du Pont may join the lineup (*CW Technology Newsletter*, Oct. 3).

Paradoxically, some silicon producers who are betting heavily on the high-purity-silicon market consider increased interest in lower grades a boon rather than a bane. Production of Grade 1 silicon, it's explained, is still very much a "happencance," and process difficulties force output of far more Grade 2 and 3 silicon than of Grade 1.

Capacities Exaggerated? There's considerable difference of opinion among experts about the total U.S. silicon capacity, and about capacities of various producers. Many firms have not revealed their plant design capacities—and industry estimates on these vary widely. Also, say some observers, reported capacities have been grossly exaggerated in some cases, thereby badly distorting the nation's over-all silicon supply/demand picture.

One possible explanation of the capacity confusion: producers may be talking about theoretical potential outputs of high-purity silicon that would be obtained with one pass of raw material under ideal conditions;

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actually, only part of each processed silicon batch is generally good enough to move directly from initial purification to final purification steps. Bulk of the material must be returned for reprocessing if top-quality silicon is desired.

The U.S. Bureau of Mines reported in '58 that total capacity of six producers* amounted to 165,000 lbs./year. On the other hand, one independent observer figures the total "true" silicon capacity of the nation (electronic grades; not including solar-grade silicon) at about 115,000 lbs./year—and this total includes capacity of 11 producers. (Foote Mineral, for example, is included in the list, although company spokesmen say no silicon has yet been sold "outside.")

Ample Supplies: The latter, more conservative estimate of capacity appears more than ample for current needs; best available estimate of '59 consumption of silicon is about 80,000 lbs. of semiconductor-grade and 20,000 lbs. of solar-grade material.

Nevertheless, there is no fear of immediate serious overcapacity (unless too much extreme-high-purity product is made, as the Aries report suggests). Silicon demand is expected to grow about 30%/year, at least through '63—that's on top of a doubled demand in '58, compared with '57.

Oriental Onslaught: Last week, the Electronic Industries Assn. wagged an accusing finger at Japanese semiconductor exports. The group warned the Office of Civil and Defense Mobilization that heavy competitive pressure by the Japanese will retard growth of the U.S. electronics industry, pose a serious threat to national security. (Close to one-third of all transistors sold go into manufacture of military equipment.)

Japan reportedly produced about 15 million transistors in the first quarter of '59; that compares with about 26.7 million made in Japan in all of '58, 560,000 in '56. The units are shipped here both as separate units and as components of transistorized equipment (for exam-

* Du Pont, at Newport, Del., and Brevard, N.C. (latter capacity 50,000 lbs./year); International Metalloids, at Toa Alta, Puerto Rico (20,000 lbs./year); Merck, at Danville, Pa. (25,000 lbs./year); Sylvania Electric Products, Towanda, Pa.; Texas Instruments, Dallas, Tex.; Eagle-Picher, Miami, Okla. Combined capacity of the last three and Du Pont's Newport unit was put at 70,000 lbs./year.

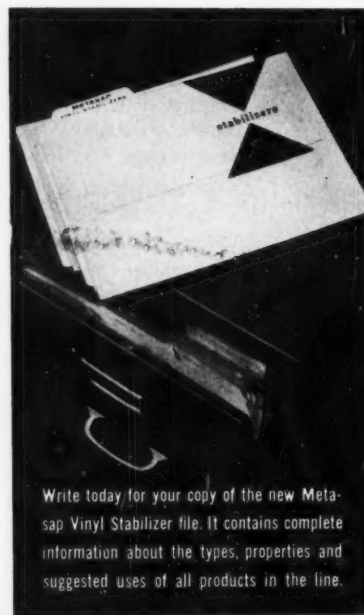
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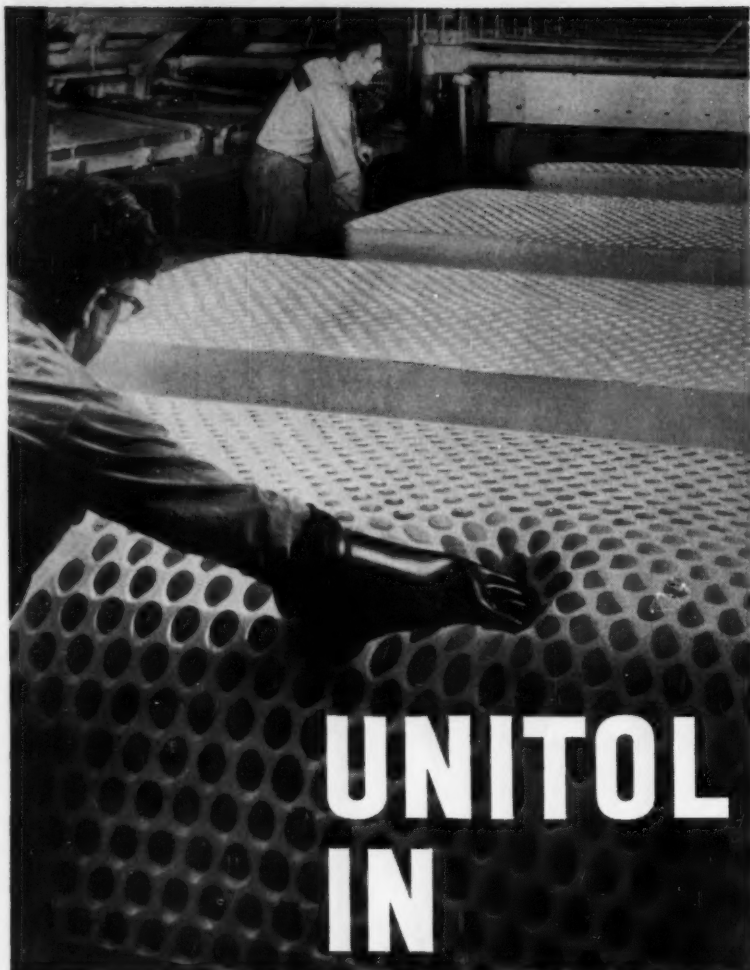
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ple, Japanese sources report that of more than 1.9 million transistor radios exported last year, approximately 1.2 million were sent to the U.S.).

Obviously, the sale of foreign-made transistors and transistorized equipment affects not only U.S. equipment makers but also producers of semiconductor materials (silicon, germanium, selenium). U.S. silicon producers will therefore take more than a passing interest in results of EIA's protest to the U.S. government.

Germanium's Role: The threat of Japanese competition and alleged misdirection of silicon product development are but two problems confronting silicon makers. In addition, there is considerable difference of opinion among industry experts about competitive impact of silicon on germanium in electronic uses. Some say germanium is on the way out; others insist there will always be a place for it.

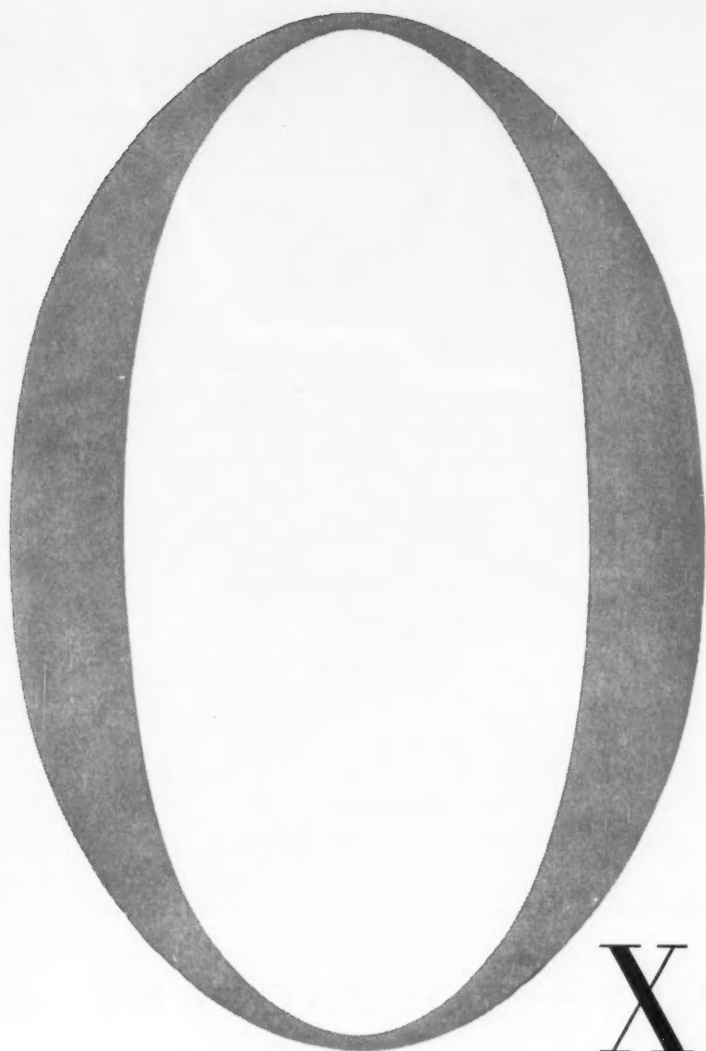
Still largely in development stages are the host of other semiconductor materials—particularly gallium compounds—which might some day become potent market factors. Meanwhile, considerable development is going into so-called "tunnel diodes," electronic devices related to transistors in both form and function; they have already been made of a wide variety of materials, including germanium, silicon, and gallium compounds. Which materials are best hasn't been decided.

Also getting close scrutiny are a host of other promising semiconductor materials—e.g., intermetallics, organic semiconductors.

It seems clear that silicon will play an important part in the booming electronics market. But just how important is still tough to tell.

Special puzzler now is the role of high-purity silicon. Aries says some firms can't now sell high-purity silicon in bulk, have processes that show only "illusory" profits, are adulterating Grade 1 silicon to lower grades or selling their top-quality product as Grade 3.

On the other hand, current and up-coming producers of high-purity silicon show no signs of letting up in their push for top-grade products; they are betting heavily that all grades of silicon will find applications—and ride the crest of a long-time electronics boom.



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Technology Newsletter

CHEMICAL WEEK
October 10, 1959

Process heat reactors will be competitive with coal by '70, the Atomic Energy Commission predicts, in areas where conventional fuel costs are high. That's the highlight of discussions at an AEC symposium on nuclear reactors for process heat, held last week in Germantown, Md.

John Kaufman, chief of AEC's reactor development division's evaluation and planning branch, estimated that a \$1.5-million, 40-megawatt coal-burning plant in New England would operate at a total cost of about 90.5¢/1,000 lbs. of steam. Of this total, 60¢ would go for fuel, 21.2¢ for capital charges. A \$3-million-plus process heat reactor of the same capacity, utilizing available technology, would operate at about 99¢/-1,000 lbs. of steam—including only 26¢ for fuel, 44.2¢ for capital charges. But by substituting less-expensive materials of construction, said Kaufman, capital costs may be reduced by about 10%; fuel costs, by as much as 5¢/1,000 lbs. of steam. Result: low-temperature nuclear heat costing only 87.6¢/1,000 lbs. of steam.

Chemical and paper producers are the best prospective customers for nuclear process heat. Marshall Ray, of AEC's reactor development division, cited forecasts that heat consumption by manufacturing industries will almost double by '67. But several major users—such as steel, glass and portland cement manufacturers—require higher temperatures than can be obtained from heat reactors; others, such as petroleum refiners, use their own waste products for fuel.

Several questions about process heat generation (*CW Technology Newsletter*, Sept. 19) may be answered by AEC's experimental reactor planned for the Interior Dept.'s saline-water conversion plant in California. But Frank Pittman, director of the reactor development division, adds: "We expect industry at the same time to carry on its own investigations."

Industry representatives raised the question of reliability, public relations and labor problems arising from the presence of radioactivity and the vast uncertainties of costs. And AEC emphasized that heat reactors could be located only where the processor controlled an exclusion area one-quarter to one-half mile in radius.

It's clear that industry prefers to "wait-and-see." As one conferee put it: "If heat reactors are expected to be competitive in high-cost areas within 10 years, then what's the hurry?"

Westinghouse plans to market "competitive" power reactors, last week revealed that it's ready to take orders for three nuclear power plants ranging in cost from \$28.3 to 72.4 million. Two of the plants are expected to produce power at 7.3 mills/kw., which is economically competitive with coal-burning plants in some areas. One of the proposed installations is described as a 330-megawatt, closed-cycle, water-moderated plant;

Technology

Newsletter

(Continued)

estimated cost: about \$68 million, plus research and developmental expenses.

•
A new antiknock compound, which adds methylcyclopentadienyl manganese tricarbonyl to tetraethyl lead, has been introduced by Ethyl Corp. (New York). It is most effective in alkylates and paraffinic naphthas, moderately effective in olefins, least so in aromatics. "In fuels in which it is most responsive," says Ethyl, the new product "will provide octane numbers at a lower cost than can be obtained from TEL alone or by refinery processes."

•
The first commercial plant using the polymerization process of Indiana Standard Oil for polyethylene and copolymer production has been built by Furukawa Chemical Industries Co. (Tokyo, Japan). The Furukawa plant, completed in less than a year, has capacity for producing 20 million lbs./year of linear (high-density) polyethylene.

Furukawa is a late-comer on the scene. Spencer Chemical and Tennessee Eastman have been Indiana licensees for several years (*CW*, Aug. 4, '56, p. 88). But Spencer tells *CW* it has no active plans now for a commercial plant based on the Indiana process. Spencer is making medium and low-density polyethylene using the Imperial Chemical Industries process.

Tennessee Eastman declines to comment, but its license with Indiana Standard is believed to be still active. Reportedly, TE is still looking at linear polyethylene. It also has an ICI license, has its own polyolefin process, and has been operating a polypropylene pilot plant.

The Indiana Standard patents cover a broad range in the field of olefin polymerization, cover a choice of "probably several hundred catalysts." For this reason, they are probably of as much interest to the licensees as for polyethylene production only. And until the muddled patent situation is cleared, there is undoubtedly a factor of safety in holding an Indiana license.

•
A new method of encapsulating liquid rocket fuels or oxidizers has been proved "feasible" in crude experiments disclosed last week by Southwest Research Institute (San Antonio, Tex.). The technique consists of first freezing a fuel-containing plastic capsule in dry ice, then coating the frozen capsule by dipping it in molten metal (probably aluminum or magnesium). SWRI is investigating several plastic encapsulating materials, and is continuing work on using higher-melting metals.

•
A nuclear rocket using liquid hydrogen propellant is the goal of engineering studies initiated last week by the National Aeronautics and Space Administration. NASA will negotiate a basic research contract with Lockheed Aircraft Corp. (Marietta, Ga.), expects the job will take more than three years, cost more than \$1 million. Studies will concentrate on materials capable of withstanding combined conditions of a high radiation level and the extremely low temperatures (around -425 F) encountered in such a system.

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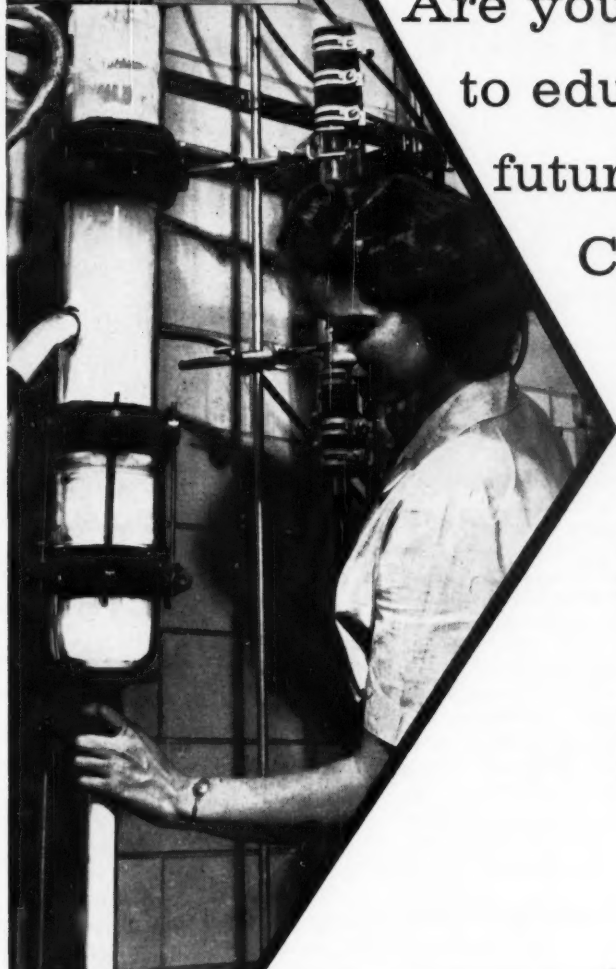
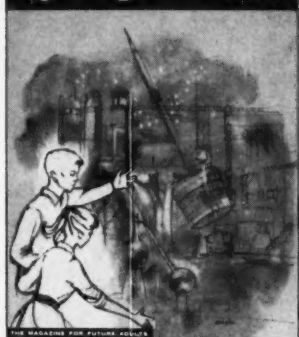


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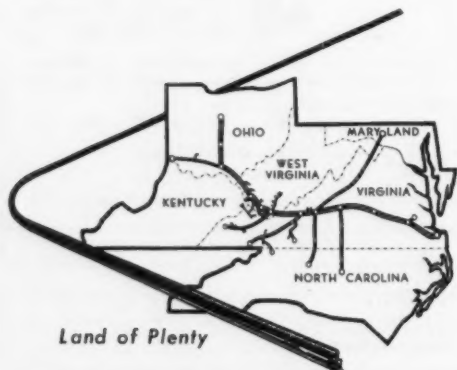
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TOWN FATHERS

Everybody Paints in Town's Big Cleanup

A broad-scale public relations and goodwill gesture by Pabco Paint Division of Fibreboard Paper Products Corp. is now nearing completion in Truckee, Calif. Pabco literally helped the town paint itself.

Truckee is the gateway to the great Squaw Valley area, where the 1960 winter Olympic games will be held. One of the slogans: "Paint Up to Meet the World."

Residents, mindful that European winter resorts are bright, clean and colorful, cast a baleful eye on some town eyesores. Consensus: much needed fixing before the expected influx of international visitors. Pabco offered to help.

Proposals: After a mass community appeal led by the local newspaper, community leaders, and a Pabco paint and building materials dealer, a call was sent out to one of Pabco's color counselors to make up a color plan for the town. After several meetings (during which a proposal by a Pab-

co competitor, W. P. Fuller & Co., was also considered), the Truckee chamber of commerce adopted Pabco's ideas.

The project followed a simple pattern of cleaning up and then painting. On April 11, cleanup day, townspeople began getting rid of trash, and sprucing up areas that gave the town a badly weatherbeaten look.

April 25 was the first paint-up day. Guided by planners from Pabco, city fathers organized the activities. Three beauty queens reigned over the event. The high school band marched through the streets to cheer the painters, volunteers from school and adult clubs and groups. Goal: to paint, as Pabco dealer Rex Reid put it, "everything that couldn't be moved."

All through the summer, the project continued. Now, as temperatures are sharpening, the final touches are going on. By mid-campaign, Pabco reports, more than 6,000 gal. of paint had been used on houses, stores and

public buildings, both in Truckee and in the nearby Donner Lake area.

Administration: To Pabco, the greatest expenditure connected with the program was in management time; several color consultants were loaned to the project. The paint was sold at a big discount through Pabco's local retail outlet.

But there were difficulties. In many cases, structures were too far gone for a single coat of paint, and extra coats were necessary. Another problem: absentee ownership of many of the buildings made it difficult to get permission to paint, and to get decisions as to what colors to use. One large firm, which owns a large number of buildings in Truckee, agreed to participate, but only after considerable persuasion. The payoff for Pabco is not only in the goodwill of the townspeople and the paint sold but also in the advertising value of the program. Prominent signs illustrating the part the company played will be displayed

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ADMINISTRATION

during the games this winter. They will be visible from the new Freeway, which traverses Truckee, and from the railroad. Thus, visitors from all over the West—Pabco's principal market area—will learn of the company's contribution.

Also Active: W. P. Fuller has been active in such goodwill ventures for several years. It began about the end of '56, when the wife of the company's director of advertising and sales promotion lent her professional decorating talents to the revitalization of the main street of the town where the couple lives, Tiburon, Calif., a suburb on San Francisco Bay.

The results of that effort attracted wide publicity. The renovation of several towns, including Portola, Weaverville and Buckley, Wash., soon followed, and the campaign proved so successful that Fuller formed a Community Projects Division to carry it forward. Now, a number of state governments and the Urban Renewal Operations Committee of the District of Columbia have shown considerable interest in the idea.

Whether such campaigns produce more than goodwill, publicity and advertising is hard to tell. But painting a whole town takes a lot of paint, even at a discount.

Career Guidance Plan

Career guidance counselors in the Chicago area last week gathered to hear chemical industry members of the Drug and Chemical Industry Activities Committee of Illinois discuss the outlook for jobs in chemical plants.

The meeting, second of an annual series sponsored by DCIAC, brought out a variety of views on opportunities, also pointed up a major problem in counseling high school youngsters.

Counselors say that the long period between high school and the completion of training for specialized chemical careers cools the interest of youngsters. Most of the careers discussed at the meeting require a minimum of a bachelor of science degree, and in most cases a master's degree, or in many instances a Ph.D. To a student in high school, this means it would be four to eight years before he could start working.

Conferees' suggestions for easing the problem included: provide a closer

liaison between students and companies throughout the career-forming period, and overhaul scholarship programs. Aim here is to give students from a given area a better chance to get schooling at their local colleges. It's hoped that with opportunities close at hand students' interest could be maintained over the long period of technical training.

California Tab-Keepers

Three new state offices in California may soon be affecting operations of chemical process industries there. They were set up recently to keep tabs on economic developments, automation and atomic energy developments.

The first, an Economic Development Agency, was established by the '59 state legislature to put special emphasis on promotion and solicitation of new business and maintenance of present industries. It will also provide information, studies and statistical tools necessary for improving the general business climate.

In addition, a committee of Gov. Edmund Brown's Governor's Council has been appointed to take on "the highly important task of studying the effects of automation and mechanization on employment in California." Though the committee may make recommendations for possible legislation in this field, indications are that action will be directed toward training, education and applications of unemployment compensation law.

According to Governor Brown, the committee's task will be to find out what can or should be done to make the transition to greater automation "as painless and fruitful as possible." Also, the state's first coordinator of atomic energy development and radiation protection has been appointed. That post has just been created by the legislature.

He is Alexander Grendon, a former deputy commander of the Army Chemical Corps research and engineering command. His job calls for fostering "the constructive development of industries producing or utilizing atomic energy and radiation" and eliminating "unnecessary exposure of the public to ionizing radiation." Observers expect the coordinator to emphasize administration and distribution of information.

New uses
are still being found for

GROCO RED OILS & WHITE OLEINES

SPECIFICATION	WHITE OLEINES		RED OILS			
	GROCO 6 USP	GROCO 5L Low Linoleic	GROCO 2	GROCO 4	GROCO 8	GROCO 18
Titre	2° — 5°C.	2° — 5°C.	3°C. max.	4° — 6°C.	8° — 10°C.	18° — 20°C.
Titre	36° — 41°F.	36° — 41°F.	37.4°F. max.	39.2° — 42.8°F.	46.4° — 50.0°F.	64.4° — 68°F.
Color 5 1/4" Lovibond Red	1 max.	1 max.	1 max.	1 max.	1 max.	2 max.
Color 5 1/4" Lovibond Yellow	8 max.	8 max.	10 max.	10 max.	10 max.	15 max.
Color Gardner 1933	2 max.	2 max.	—	—	—	—
Unsaponifiable	1.0% max.	1.0% max.	1.5% max.	1.5% max.	1.5% max.	1.5% max.
Saponification Value	199 — 204	201 — 206	198 — 203	198 — 203	198 — 203	204 max.
Acid Value	198 — 203	200 — 205	197 — 202	197 — 202	197 — 202	203 max.
% F.F.A. as Oleic Acid	99.5 min.	99.5 min.	99 min.	99 min.	99 min.	99 min.
Iodine Value (WIJS)	95 max.	90 max.	95 max.	94 max.	92 max.	85 max.
Refractive Index 50°C. (Average)	1.4500	—	1.4505	1.4500	1.4495	1.4485
Total Polyunsaturated Fatty Acids	—	3.5% max.	—	—	—	—
COMPONENT FATTY ACIDS						
C14 Myristic	5%	6%	5%	5%	5%	5%
C16 Palmitic	3%	2%	4%	5%	6%	10%
C18 Stearic	1%	—	1%	1%	2%	4%
C18 Oleic	82%	89%	80%	79%	77%	72%
C18 Linoleic	8%	2.5%	9%	9%	9%	8%
C18 Linolenic	1%	0.5%	1%	1%	1%	1%
MACKEY TEST:						
Time to reach 105°C.	over 7 hrs.	over 7 hrs.	over 4 hrs.	over 4 hrs.	over 4 hrs.	over 3 hrs.

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ADMINISTRATION

LEGAL

Color Rule: A new rule that tightens the specifications for the certification of FD&C Red No. 1 dye goes into effect Oct. 13. The old rule, it was felt, was too broad in its specifications describing the color. New specifications have been written designating the compositions by percentage of contained amines after reduction of the dye. Under the law, the old specifications used boiling ranges for identification of the amine mixtures.

Product Dilution: A. E. Staley Manufacturing Co. has filed suit in Boston federal district court against Packers' Laboratory (Boston) charging trademark infringement and unfair competition. The suit alleges that Packers' purchased monosodium glutamate from Staley, diluted it from the 99% purity called for on the label, to about 90%, by adding sodium chloride. Staley claims the resulting product was sold under its own Staley trademark, and seeks a restraining order and damages against Packers'. The suit followed seizure by federal authorities of three 100-lb. drums of the product.

LABOR

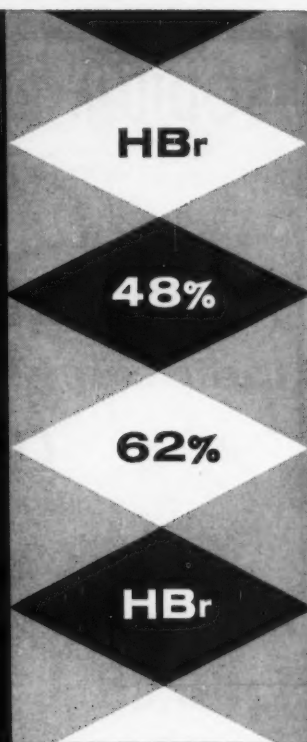
Steel Layoff: The pinch of the prolonged steel strike is being felt at Ashland, Ky., where Allied Chemical Corp.'s Solvay Division has been forced to lay off 200 employees. The plant, with 250 people still working, is operating at about 20% of capacity. It supplies coke to nearby Armco Steel Corp., idled by the strike.

Cutter Struck: Cutter Laboratories (Berkeley, Calif.) has been struck by 250 members of Local 6, International Longshoremen's and Warehousemen's Union, over a wage dispute. ILWU workers perform maintenance and some production work. The union is seeking a 25¢/hour wage increase; the company has offered 10¢/hour.

Potash Settlement: At American Potash & Chemical Corp.'s Henderson, Nev., chlorate and perchlorate plant, four craft unions that have been on strike since April 20 voted to accept wage increases ranging between 10-15¢/hour, the same

Hydrobromic Acid

*Can help you make drugs, dyes,
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Check these useful reactions: Hydrobromic acid is a strong acid which reacts readily with most inorganic bases to produce inorganic bromides such as lithium, sodium, potassium and ammonium bromide, useful in photographic processes.

It reacts with many aliphatic alcohols in the presence of dehydrating agents to produce aliphatic bromides. Aliphatic bromides, which are generally more reactive than the corresponding chlorides, are useful in the preparation of Grignard reagents and other organometallic bromides, quaternary ammonium salts and as alkylating agents.

Hydrobromic acid can be used to cleave ethers to produce aliphatic alcohol and bromide. It will also react with epoxides to produce vicinal bromohydrins with two reactive centers, thus, permitting many additional reactive possibilities.

Ask for our help: Michigan Chemical produces 48% Technical Grade Hydrobromic Acid and is the sole producer of 62% Technical Grade Hydrobromic Acid in commercial quantities. Our wide experience in bromine and bromine derivatives is immediately available to you through our Technical Service Group. Our plants in Saint Louis, Michigan and El Dorado, Arkansas provide dependable sources for high purity bromine chemicals in constant supply—up to tank car quantities, if desired. Write us about your area of interest or for technical data and prices.

*For complete listing of Michigan Chemical products, see your copy of
Chemical Materials Catalog or Chemical Week Buyers Guide.*

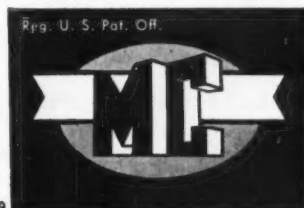
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Analysis:	48% Technical
Molecular Weight:	80.924
Specific Gravity at 20/4° C:	1.488
Pounds a gallon at 20° C:	12.4
HCl, not more than:	0.10%
Vapor Pressure at 30° C:	—
Vapor Pressure at 50° C:	—

Analysis:	62% Technical
Molecular Weight:	80.924
Specific Gravity at 20/4° C:	1.74
Pounds a gallon at 20° C:	14.5
HCl, not more than:	0.15%
Vapor Pressure at 30° C:	85 mm
Vapor Pressure at 50° C:	380 mm



C-58-9

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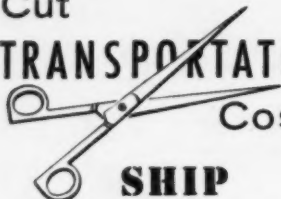
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Chemical Week's BUYERS' GUIDE ISSUE—1960

ADMINISTRATION

amounts originally offered by the com-
pany. Unions involved were Operating
Engineers, Plumbing & Pipefitters, In-
ternational Brotherhood of Electrical
Workers and International Assn. of
Machinists. The strike followed the
break-off of wage-reopening talks at
the mid-point of a two-year contract
that expires next April.

Amoco Hassle: No change was in
prospect last week at the two strike-
bound plants of American Oil Co. at
El Dorado, Ark., and Texas City, Tex.
At Texas City, plant management
and striking Oil, Chemical & Atomic
Workers Union, Local 4-449, renewed
talks after both sides had agreed to the
new attempt at resolution.

Meanwhile, the local has filed
charges with the National Labor Rela-
tions Board, claiming unfair labor
practices by Amoco, based upon the
letter sent to striking employees by
plant management telling them to
return to work or be replaced
(*CW*, Sept. 9, p. 98). The union
charges that Plant Manager B. F.
Babin placed responding employees
"on a 'do not replace' list and thereby
disclosed company favoritism and
promises of benefit to employees who
have signed the letter. . . ." It also
charges that Babin made statements
in newspapers promising supersenior-
ity to employees who would follow
through on the letters.

At El Dorado, Refinery Manager
H. A. Heiss has reported that there's
"unfortunately little hope for an early
settlement." Federal mediators are
working with management and strik-
ers at both plants.

Jurisdictional Decision: Jurisdic-
tional disputes among labor unions, a
festering sore to craft and industrial
unions since merger of the AFL and
CIO, may receive prompter treatment
in the future. The problem has been
of particular interest to the Oil, Chemi-
cal & Atomic Workers Union, which
has asked for formal federation action
against "raiding" by AFL-CIO Metal
Trades Dept. (*CW*, Jan. 3, p. 42).

Federation members now are work-
ing to implement an AFL-CIO ex-
ecutive council proposal, made at the
biennial convention in San Francisco
last fortnight (*CW*, Sept. 26, p. 24),
that would establish machinery for
arbitrating interunion disputes. The
move completely reverses traditional

PROBLEMS AND SOLUTIONS IN LACQUER TECHNOLOGY...

one of a series of advertisements designed to acquaint formulators with the properties and applications of the various types of cellulose acetate butyrate.

Which type of cellulose acetate butyrate would you select for this coating problem?

PROBLEM:

**To formulate a premium lacquer
for coating paper-back book jackets**

ANALYSIS: To give maximum visual appeal to books on display, the lacquer must produce a coating that is clear, colorless and high in gloss. Secondly, because pocket books are exposed to sunlight in store windows for extended periods of time, they must be coated with a lacquer that will not discolor upon aging. Normally, pocket books are subjected to

considerable abuse in handling, too; consequently, the lacquer must be tough, flexible and scuff-resistant. Good adhesion to inked surfaces is another requirement. The lacquer must not block at temperatures up to 300°F. And, finally, it must be easy to formulate and adaptable to conventional finishing techniques.

SOLUTION: In order to attain a coating with the required high blocking resistance, it is necessary to incorporate a cross-linking thermosetting resin. Excellent resins for this purpose are based on urea formaldehyde. These resins, when properly catalyzed, cure at the temperatures and times used by paper coaters, yet lacquers containing them exhibit good pot life—3 to 4 days.

Of the four types of butyrate film formers available, let's rule out EAB 171; for, being low in butyryl content, it is least compatible with urea formaldehyde resins. On the other hand, EAB 500, the highest butyryl content ester (50%), is not the answer either as it produces relatively soft films.

Our choice lies, therefore, between EAB 272 (butyryl content: 27%) and EAB 381 (butyryl content: 38%), as both of these types produce films that meet the requirements of this lacquer

application for flexibility, toughness, scuff resistance and adhesion.

EAB 381 has greater tolerance for various lacquer solvents and permits formulation of lacquers with higher solids content than does EAB 272. This is especially true of the low-viscosity grade, EAB 381-½, commonly known as Half-Second Butyrate. For this application it appears to be the most suitable type of cellulose acetate butyrate.

In common with all butyrate film formers, Half-Second Butyrate produces clear, colorless, high gloss coatings that do not discolor or yellow upon aging or exposure to sunlight.

Eastman cellulose acetate butyrate is free-flowing and non-hazardous in storage. It is shipped as a fine dry powder in 50-pound multi-wall paper bags. Your request for help on a specific formulation problem is welcomed by your Eastman representative.



Authoritative, detailed information on the various types of cellulose acetate butyrate, including their chemical composition, physical properties and their use as film formers in metal lacquers, wood finishes, and textile and paper coatings is contained in Eastman's 72-page booklet, "Cellulose Acetate Butyrate for Protective Coatings." It is a comprehensive, complete source file of fundamental information, reporting the results of years of work in formulating, testing and evaluating coatings based on cellulose acetate butyrate. Make sure a copy is always at hand by writing to the address below for yours.

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SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; Atlanta; Chicago; Cincinnati; Cleveland; Framingham, Massachusetts; Greensboro, N. C.; Houston; New York; St. Louis. **West Coast:** Wilson Meyer Co., San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

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substantially increases
WET STRENGTH
in paper... without increasing cost

Because it is more efficient, Catalin Resin 301 . . . a modified, cationic urea-formaldehyde resin . . . can substantially upgrade wet strength with the same percentage of resin solids previously used . . . or cut resin costs by maintaining present wet strength properties with less resin solids. You gain in other ways too . . . Catalin Resin 301 is lighter in color . . . and reacts exceptionally well in the presence of dyes. Dry tensile, mullen and folding endurance is also improved.

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ADMINISTRATION

union practice. The plan would provide for final and binding decisions on all interunion conflicts by an impartial arbitration board. When the plan is fully developed, a special convention of the unions will be called to make any constitutional changes deemed necessary to put it into effect.

KEY CHANGES

C. C. Schulze to assistant general manager, **Joseph W. Conlon** to director, manufacturing, Dyestuff and Chemical Division, General Aniline & Film Corp. (New York).

Edward H. Petrick to vice-president and general manager, Paper Division, **Hugh D. Jordan** to general manager, Sulphite Pulp Division, **Malcolm T. Murray** to staff vice-president, **Conrad T. Waldie** to general manager, Towel Manufacture, Conversion and Sales, **Roland E. Fickett** to Berlin assistant to chairman of the board, all of Brown Co. (Berlin, N.H.).

Robert D. Scarlett to director of new foreign development, **Audun Fredriksen** to managing director Minnesota Mining & Manufacturing m.b.h., 3M's German manufacturing subsidiary, and **Neil S. George** to manager, international advertising and marketing services, all of Minnesota Mining & Manufacturing Co. (St. Paul).

David Fulton to vice-president, worldwide sales, Chemical Construction Corp. (New York).

Oscar H. Johnson to assistant to the division manager, Niagara Chemical Division, Food Machinery and Chemical Corp. (Middleport, N.Y.).

George E. Hulse to director, research and development, Chemical Products Division, Chemetron Corp. (Louisville).

Donald H. Brewer to vice-president, plastics processing operations, Rexall Drug and Chemical Co. (Los Angeles).

H. Robert Diercks to board of directors, Cargill, Inc. (Minneapolis).

RETIRED

Ronald E. Heaton, secretary and assistant treasurer and first employee of Synthane Corp. (Oaks, Pa.).

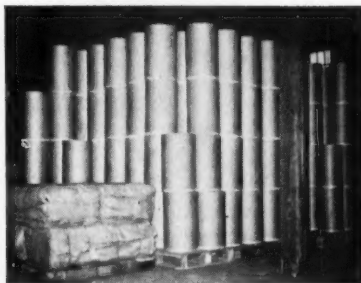
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PAPER "SHED," weather-tough and re-usable, provides economical outdoor protective storage for bagged chemicals, building materials, etc. Often eliminates permanent storage shed at a big saving. Bemis-made of laminated paper, asphalt, and glass fiber.



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13

CHOICES

for improved solids deliquification

4 sizes of CONICAL SCREEN CENTRIFUGE



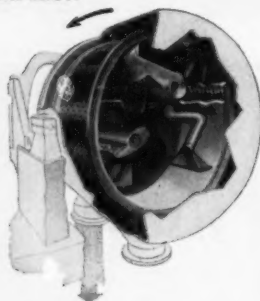
The Sharples Continuous Dehydrator is especially applicable for high concentrations of medium-to-coarse crystalline solids and fibrous pulps.

By changing the size of the openings in the perforate plate and by changing the rotational speed, varying degrees of liquid clarity and/or solids dryness can be achieved as desired. Available in four sizes, with solids handling capacity ranging from a few hundred lbs./hr. to 50 tons or more/hr.—e.g., on synthetic ammonium sulphate the Model 510 will dewater 50 tons/hr. or more to 1% or less residual moisture.

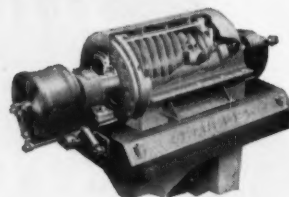
Write for Data Sheet on the Sharples Continuous Dehydrator.

3 sizes of AUTOMATIC PERFORATE BASKET CENTRIFUGE

The Sharples Super-D-Hydrator has an excellent performance record on materials with low drain rates, where product purity is of critical importance. By applying high centrifugal force (to 1250 x g), a unit load of crystals can be handled very rapidly; with the thin crystal layer, there is little filtration resistance, and crystals quickly give up mother liquor. Designed for multiple rinsing for super purity such as is demanded by the polyolefins. Capacities range from a few hundred lbs./hr. to 25 tons/hr., depending on characteristics of slurry. Available for pressure operation. Write for Bulletin 1286.



6 sizes of SOLID BOWL CONTINUOUS CENTRIFUGE



The Sharples Super-D-Canter is a high speed clarifier or classifier, applicable to an extremely wide range of both amorphous and crystalline solids ranging from relatively large size particles down to those a few microns in size.

Solids handling capacity ranges from as little as a few lbs./hr. up to 10-15 tons/hr. and liquid handling capacity ranges from a few gal./hr. to several hundred gal./min.

For example—in the classification of kaolin clay slip a P-7000 Super-D-Canter delivers 16 to 18 tons/hr. of classified product in the liquid discharge (80%-90% 2 microns).

Models are available for operation at pressures to 150 psi. Write for Bulletin 1254.

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PRODUCTION



FE's Conway, Kelley, O'Connell, Marshall study results of equipment and systems evaluation.

Seeking Trouble in Systems Maintenance

The men pictured above are looking for trouble—the kind chemical companies may have in maintaining various plant systems and pieces of equipment. They are members of Federal Electric Corp.'s (Paramus, N.J.) engineering team that this week is launching a drive to sell its equipment and systems evaluation services to the chemical industry.

Federal Electric, which is International Telephone and Telegraph Corp.'s service organization, has been conducting similar evaluations for the government. But, like other companies with a preponderance of government business, it is seeking balance through industrial jobs. And it feels it has much to offer chemical and petroleum companies, particularly in the rapidly expanding instrumentation field.

FE's military experience is impressive. It maintains the Distant Early Warning (DEW) Line in the Far North and the White Alice communi-

cations system for the Alaskan Air Command. Its evaluation studies of the TACAN airborne navigational device led to a 400% increase in mean time between failures. It is also evaluating the maintenance of communications, sonar and radar systems on the Navy's destroyers.

While FE's evaluations have been basically of electronics systems, they have also dealt with mechanical and electromechanical equipment. Admitting that the company has no chemical industry experience, Ed O'Connell, manager of equipment and systems evaluation, shrugs off this point, says, "there's a basic similarity between evaluations of various systems."

Somebody with Troubles: In seeking to put this experience to work, Bob Marshall, general sales manager, cites two examples that are ripe for systems evaluation. One is the older plant where maintenance costs seem to be getting out of hand. The other

is the new plant that never seems to rid itself of shakedown difficulties and high maintenance costs.

In either case, FE would take existing cost records—or set up record-keeping if none were available—and pinpoint the trouble spots as quickly as possible using statistical techniques. One area for immediate attack: spare-parts inventory.

"We've worked out practical methods of cutting down on spares, settling on a workable spare-parts level," says Joseph Conway, manager of the engineering department. He says an IBM unit is used to maintain the inventory control for all DEW Line stations, using predictions based on field failure data. Now 28,000 items are carried in inventory.

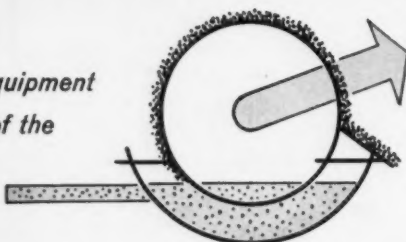
On the other hand, John Kelley, manager of communications and electronics, picks a problem that he figures will grow as plants add process instrumentation—already at the 10%-

DORR-OLIVER FILTERS

A SERVICE TO THE PROCESSING INDUSTRIES

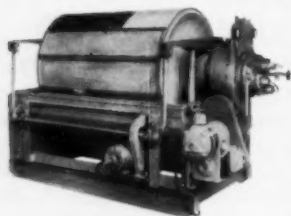
FILTRATION EXPANDS ITS SCOPE

*New ideas and equipment
pace needs of the
processing industries*



Pick any processed material, from alcohols to zirconium, and it's dollars to doughnuts that somewhere along the production line there's a filter.

Keeping on top of the many demands made on filtration equipment by modern processing often presents some tricky problems. Take corrosive applications, for instance. With rotary drum type filters, usual practice calls for stainless steel or rubber-covered construction. Capitalizing on advances in materials of construction, our engineers recently developed a filter with all essential components fabricated from tough, glass-reinforced plastics. The plastic construction not only resists corrosion, but it is also lighter and lower in cost than comparable standard machines.



This new filter has been successfully tested in handling acid leach solutions in a uranium mill and is now offered as a regular component of the Dorr-Oliver line.

This development is quoted as another example of the many contributions made by Dorr-Oliver to increase the scope and versatility of filtration equipment. Actually, it's just about

impossible to think of any type of filter for any industry that isn't made by Dorr-Oliver and that hasn't been developed or improved by Dorr-Oliver engineers.

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PRODUCTION

of-plant-investment level. "It's easy to get into a bind buying components from several sources to build an instrument system, unless the various components are properly adapted to the over-all system. And it's easy to wind up with a spare-parts inventory problem unless reliability and maintainability of the system are evaluated. We're ready to offer service in these areas," he says.

Conway adds: "Some instrument companies can offer help in this area. But we have no ax to grind because we don't have equipment to sell."

Starting from Failures: Marshall contrasts the evaluation service with other consulting services: "Most of the others start by examining the organization and its personnel. We start at the other end—with equipment."

The beginning point: actual equipment failure records. "We're interested in effectiveness as measured by trouble-free operating time and operating quality," says Conway. Equipment and system failures mean downtime, and downtime in some chemical processes can cost as much as \$5,000-10,000/hour.

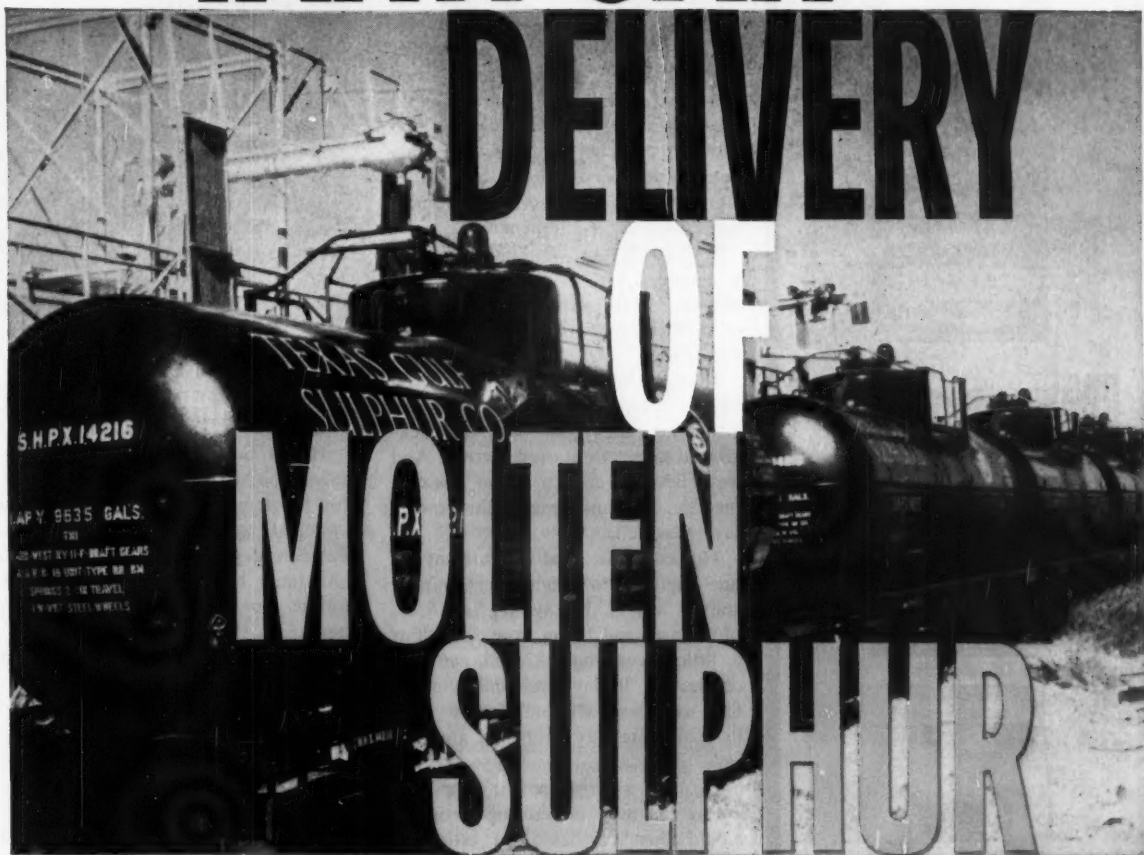
"The average plant gets out of trouble eventually—but usually only after a lot of money has been spent. By analyzing equipment and system failures statistically, we can quickly pinpoint problem areas, pick out trends," says O'Connell. Du Pont is similarly analyzing equipment failures statistically at some plants (*CW*, April 25, p. 79).

O'Connell points out that there are two factors that enter into failure analysis—reliability and maintainability. "Reliability is the probability that a device, equipment or system will perform its intended function for a specified period of time under given conditions," he says.

Maintainability is the characteristic of equipment design that permits or enhances easy maintenance. Simply: reliability is related to the number of failures and maintainability to time needed to make a repair. As O'Connell points out, statistical analysis of failures will not only pinpoint trouble spots and trends but also give clues for determining adequate size of maintenance staffs.

Statistical techniques of predicting reliability got their first real push in the electronics industry several years ago. But they quickly lost favor, re-

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PRODUCTION

gained it only after firms learned how to use them properly.

FE took up the reliability cudgel about four years ago, formed an equipment correction group as a service for Federal Telephone and Radio Corp. (now ITT Laboratories).

Use of the techniques to predict maintainability is only two or three years old, says O'Connell. FE sold this type of service to the Navy two years ago. Statistical analysis then became an operating tool, for use on systems, rather than as a helpmeet exclusively for equipment makers.

"Reliability and maintainability of a system can't be restricted to machines. We're interested in the entire man-machine relationship that makes the system," Kelley adds.

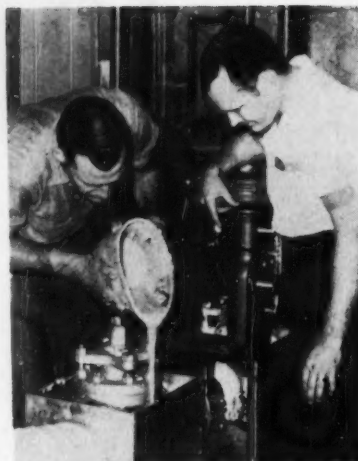
Cost and Savings: "We are prepared to help companies carry out statistical evaluations they don't have the background to carry out on their own. And we believe we can do this at less cost than the companies can on their own," says Marshall.

He estimates that assignment of one engineer to conduct preliminary studies would be about \$120/day, plus travel and living expenses. "For a little more than \$2,000, we can conduct a 30-day preliminary study that will show a company just what its maintainability problems are," he says.

Costs of a permanent or temporary corrective and monitoring program would then be based on estimated savings. "These savings could run to 20-25% in spare-parts inventory alone," says Marshall.

FE admits it could not conduct the program without the assignment, at least on a temporary basis, of engineering personnel from the company involved. "The company's engineer would have the chemical process know-how we couldn't hope to obtain in any other way. And our results would require analysis by the company's engineers who would have the intimate know-how of plant required to put many of the corrective measures into effect," says Marshall.

The systems and equipment evaluation service thus would not be the complete package a company could perform on its own. But it offers the availability of a staff experienced in statistical analysis, and the promise of cost savings that few companies can afford to overlook.



Box around valve catches resin.

Pouring Insulation

Here's how Florida Power Corp. solved the problem of insulating valves for low-temperature service, when it switched to natural gas at its St. Petersburg power plant recently. An aluminum box was built around the fitting; polyurethane insulation was poured in, foamed and cured. The top of the insulation was trimmed and an aluminum cover installed.

Insulating the entire piping system with aluminum-covered polyurethane (premixed rigid polyurethane was used for pipes) cost about 10% more than foamed-glass insulation. But polyurethane does not have foamed glass's brittleness and poor resistance to vibration. Florida Power also vetoed use of glass-fiber insulation, which doesn't have rigidity; aluminum-covered glass-fiber insulation is too easily dented.

The polyurethane foam material for Florida Power was supplied by Baldwin-Ehret-Hill, Inc. (Trenton, N.J.), and installed by The Aber Co. (Baton Rouge, La.).

EQUIPMENT

Dome-Top Fermenter: A. O. Smith Corp.'s process equipment division (Milwaukee) is out with a new dome-top stainless steel fermenter designed to reduce maintenance. The curved shape is of single-piece construction, is lightweight and easy to clean.

Portable Vacuum Systems: A new series of portable vacuum pumping

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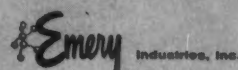
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systems is being offered by NRC Equipment Corp. (Newton 61, Mass.). The systems, offered with 2-, 4- or 6-in. diffusion pumps, are caster mounted, need only a source of cooling water and a 220- or 440-v. electrical supply for use in any location. They are said to be extremely fast and efficient, will produce as low as 10^{-6} mm. Hg pressures.

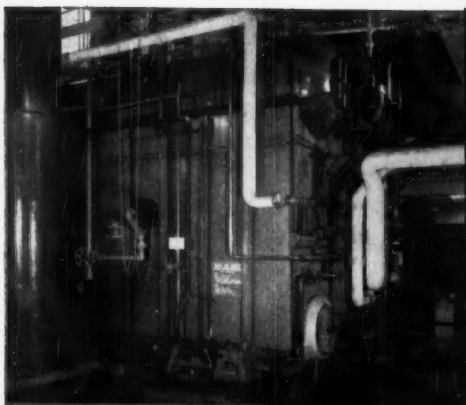
Turbine Mixer: T. L. Smith Co. (2835 North 32 St., Milwaukee) has a new, portable pilot-plant-size turbine mixer for either wet or dry blending, as well as slurry mixing. The mixer has a capacity of 0.5 cu.ft., may be easily carried by two men. The bowl is jacketed for heating or cooling, and the high-speed rotary action mixes without grinding or crushing.

Titanium Hardware: Bolts, nuts and washers made of titanium are being offered by Star Stainless Screw Co. (699 Union Blvd., Paterson 2, N.J.). The company will manufacture the items to customers' specification.

Bulk Weighing Scale: Richardson Scale Co. (Clifton, N.J.) has a new automatic scale that weighs, discharges and records small-size granular materials. It's called HHH-38, handles loads from 200-600 lbs.

Radiation Pyrometer System: Bristol Co. (Waterbury, Conn.) is now offering the Velotron low-range radiation pyrometer in conjunction with its Dynamaster electronic recorder or recorder-controller. The standard Velotron unit is said to be extremely accurate in detecting changes in temperature in the 0-400 F range; other ranges are also available (*CW*, May 3, '58, p. 50).

Manual Circuit Breakers: A new line of manually operated, stored-energy, spring-close mechanisms for power circuit breakers is now available from the low-voltage switchgear department of General Electric Co. (Philadelphia). The three models are designated AK-2-50, -75 and -100 and are rated at 1,600, 3,000 and 4,000 amps., respectively (up to 600 v.). The manual breakers can be used in many applications formerly requiring more expensive electrically operated breakers, except when remote closing is required.



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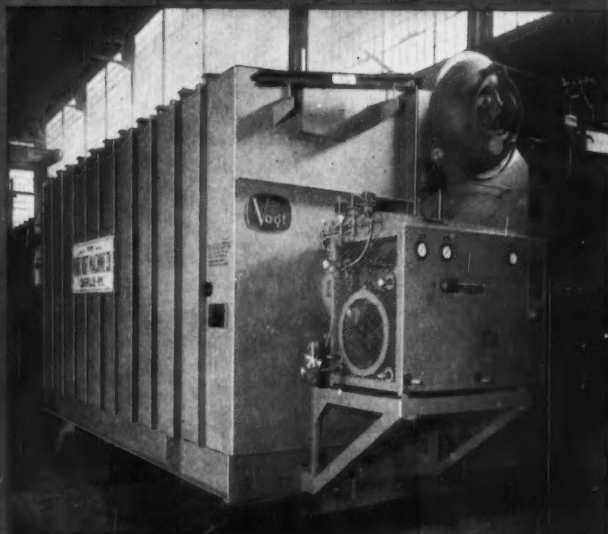
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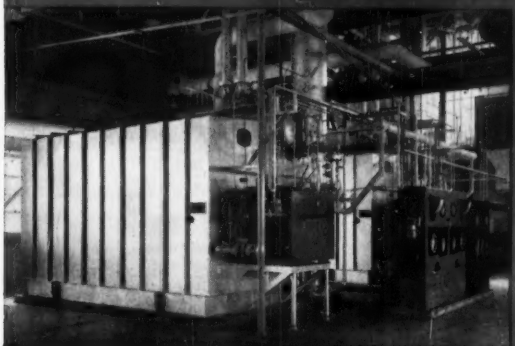
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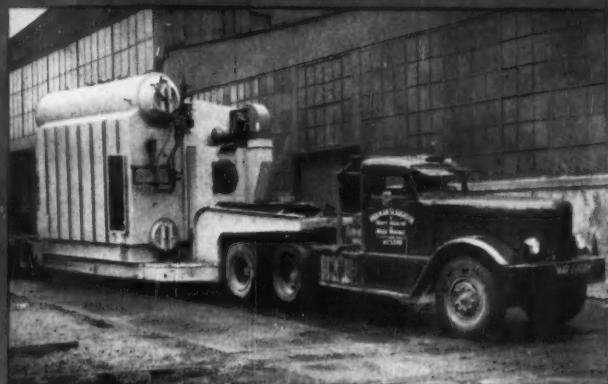
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Market Newsletter

CHEMICAL WEEK
October 10, 1959

Will total U.S. plastics output hit 6 billion lbs. in '59? Yes, said Rothe Weigel, president of The Society of the Plastics Industry, at the association's meeting in Portsmouth, N. H., last week. Production so far, according to Weigel, is running 25-30% ahead of '58 when a total of more than 4.5 billion lbs. were turned out.

This current estimate of '59 plastics production far surpasses SPI's Jan. '59 expectations—a healthy but relatively small 10% increase to 5 billion lbs.

However, the U.S. plastics picture doesn't look as bright to some other experts. George Vila of U.S. Rubber last week told the American Management Assn. in New York that the current plastics boom is “at an annual rate of 5.4 billion lbs., 17.4% over last year,” but probably won't reach the 6 billion lbs./year mark until next year.

Polyethylene and vinyl markets will each exceed 1 billion lbs. this year, agree Weigel and Vila, substantiating CW's forecast made nine months ago (*Dec. 27, '58, p. 38*).

Vila pinpoints '59 PE sales at 1.15 billion lbs., about 30% more than the 865 million sold in '58; he puts total vinyl and vinyl copolymer resin sales at 1.05 billion lbs., 25% more than the 870 million sold last year. Polyester resins, he adds, appear likely to post a 35% consumption increase, to 160 million lbs., in '59.

•
Shawinigan Resins' doubling of polyvinyl alcohol resins capacity (current “multimillion-pounds/year” capacity undisclosed) will be finished at Springfield, Mass., before '60—“reportedly a full year in advance of the initial expansion schedule.”

Shawinigan's expansion is one of several activities currently pointing up increasing industry interest in PVA. Air Reduction is pushing construction of a 20-million-lbs./year PVA plant at Calvert City, Ky., expects to have it in operation in early '60. (A pilot plant was put on-stream at Bound Brook, N. J., about three months ago.) A spokesman for Air Reduction says his firm's PVA output will go largely into adhesives, paints. How the chemical will tie in with fiber production is still unsettled.

Further evidence of growing importance of PVA: startup last week of Reynolds Metals' PVC and PVA film plant at Grottoes, Va.

•
U.S. makers of semiconductor materials for the electronics industry will get more information on the alleged competitive threat of imported Japanese semiconductor products—i.e., transistors, transistorized equipment (*see p. 65*). The U.S. government's Office of Civil and Defense Mobilization has agreed to investigate the import situation; such action was

Market Newsletter

(Continued)

recently requested by the Electronic Industries Assn., which warned that national security is jeopardized through weakening of the U.S. semiconductor industry.

Japanese electronics and trade associations reacted promptly by saying they will send representatives here to defend the Japanese industry's position. Crux of their plea: the U.S. electronics industry is prospering and Japanese semiconductor products are needed to meet surging U.S. demand for transistorized equipment.

A whopping \$13/lb. price cut on sodium borohydride, posted by Metal Hydrides, brings cost of the chemical to \$19.90; the new tab applies to "one shipment" 5,000-lb. lots of 98% pure dry material packed in polyethylene-lined, 55-gal. drums.

The price cut is attributed to increasing demand and expanded production at the firm's Beverly, Mass., plant. The new price is expected to spur use of the chemical as a synthesis reducing agent, and for in-stream "clean-up" of carbonyl or peroxides.

Along with the price cut, Metal Hydrides disclosed it had completed negotiations for exclusive rights to U.S. patents (held by three university professors) covering manufacture of sodium borohydride, and applications in organic reductions.

This will force Callery Chemical to cut sodium borohydride prices, sell at the reduced rates established by Metal Hydrides. Reason: Callery no longer makes its own borohydride, resells material it obtains from MH.

Formerly Callery—like MH—also made the borohydride under a nonexclusive license. Unable to come to terms on royalty payments, Callery abandoned the license last year. A spokesman says most of Callery's borohydride business "went out of the window" as a result.

But this does not mean that Callery will be out of the borohydride business indefinitely; the firm is still working on its own manufacturing process, which, it hopes, may turn out to be patentable.

SELECTED PRICE CHANGES—WEEK ENDING OCTOBER 5, 1959

	Change	New Price
UP		
Ammonia, anhyd., fertilizer, tanks, ton	\$2.00	\$86.00
2,4 Dinitrochlorobenzene, dms., c.l.	0.02	0.1725
2,4 Dinitrophenol, bbla.	0.04	0.41
Piperazine, anhyd., dms., t.l.	0.20	1.80
Potassium sulfate, agricultural, bulk, c.l., ton	0.05	0.645

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Lagging Payments Multiply Credit Woes

Chemical process industries credit and sales managers voiced concern last week over the marked slowdown in the payment of bills by their customers. Responding to a CW survey, many credit and sales executives said payment periods for receivables are lengthening considerably, that mounting investment in financing overdue accounts is becoming extremely costly.

To spark prompt payment and avoid new marginal risks, companies report they have spurred their collection efforts, tightened the reins on their sales staffs. And other firms are watching the tight-money credit squeeze closely for signs of trouble. Most credit officials agree that the squeeze is bound to become tighter through the rest of '59, that it may begin to let up some time in '60.

Payment Stretchout: Payment periods (time between billing and collection) have been stretching since first-quarter '59 (*CW*, Jan. 17, p. 54). Figures on the CPI from the Credit Research Foundation show an increase from a 33.5-day payment period during early '59 to 35 days in July.

Several credit managers told *CW* that payments on receivables slowed down even more sharply during August and September—by three or four days in some cases; by more than a week in others. Not uncommon are reports that chemical companies are waiting 90 days or longer for their money.

Moreover, the foundation's July "honor" list — customers of chemical companies that pay on time—included 82.7% of all customers, a drop from 85% in March and the lowest point since the early '50s. Even some of the "blue chips" are holding off as long as they can on their bills, some credit managers reported.

Extent of Credit Squeeze: But not all reports are pessimistic about the payment lag. In a related problem area — bad debts — many companies reported having their lowest bad-debt losses in several years.

But even those firms that are having no credit problems must watch both their receivables and the highest prime borrowing rate in 28 years.

Geographically, there seems to be little difference in payment promptness. But traditionally slow-paying California (especially southern) and New York were most frequently named as prime trouble spots.

Among the CPI customers who are holding back on their bills are some industry groups long known to take longer than average to pay bills. Examples: plastics fabricators, ag chemicals makers, road contractors who buy explosives. From seasonal companies such as agricultural chemicals, or plastic toy and boat fabricators, a firm "either gets its money in season, or not at all," as one credit manager put it. Small road-building contractors, for example, are described as outfits that "pay for their dynamite last—long after it's gone." Producers of metals and alloys, especially aluminum producers, are also waiting longer for payments.

Other segments of the CPI that are feeling the effects of lagging in payments include fiber makers, some industrial chemical producers, paint and varnish makers and chlorinated solvents manufacturers.

Credit managers tell *CW* one reason for the lag in payments by solvents buyers is the tendency of many firms to buy imported trichlorethylene and perchlorethylene — at a low price, but on a cash basis. Result: buyers are often short on cash, try to live off the U.S. producers' capital.

Tight Money: Credit managers generally attribute much of their trouble to the tight-money situation. Many of their smaller customers who depend on short-term financing to meet current obligations are feeling the pinch of the highest prime borrowing rates since '31. And with government borrowing for the remainder of '59 slated to top \$7 billion, any reversal of interest rates doesn't appear likely.

Intense competition is another reason for lagging payments, say credit men. Some producers are emphasizing price and credit to woo business from competitors, and boost volume. As a result, profit margins in some lines are pared perilously thin.

Moreover, observers say, some cus-



1. Slow payments, plus...



2. Mounting bills, spell...



3. More, and costly, borrowing

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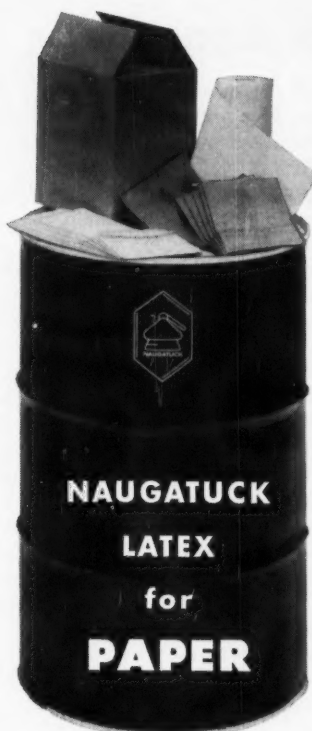


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NAUGATUCK CHEMICAL DIVISION

SALES

tomers are playing one supplier off against another to get more liberal credit terms. Many of them are small, undercapitalized businesses in which working capital is always scarce. Optimistic managers aiming for a bigger share of the market, plow back most of their cash into further capital expansion, consequently need all the credit extensions they can wangle.

Still other important factors, credit managers say, are the effects of the steel strike, and the other work stoppages.

Ripples on the Pond: Lagging payments and tightening of the money supply have alerted credit management to at least one possible consequence: a pinch in working capital with the chance of delaying capital expansion plans.

So far, few CPI firms have reported any problems of this magnitude. Nevertheless, financing a growing pool of receivables is becoming increasingly expensive, and most credit men say they consider it a serious problem.

Turning the Tide: CPI credit men are not just "watching" the credit problem. Some credit departments began "cleaning up" — tightening their loose credit arrangements and overdue accounts — soon after the upturn in business late in '58. Trade sources report it often takes up to nine months to overcome such relaxed credit policies.

But many firms being pinched are just beginning to clamp down on requests for credit extensions. Increasingly, sales departments are getting instructions to refuse business from marginal risks, in some cases, even drop the long-overdue ones unless they cooperate.

This cooperation takes many forms. In the simplest cases, it may consist of an agreement to keep the account current. In others, teams from the chemical supplier may visit a customer's plants and offices to "rehabilitate" the firm. In such cases, the customer would likely send regular reports of financial condition to the supplier, who in turn might assist in cost-accounting methods, pricing, sales training, credit and collections or other fields in which the customer needs help.

If the amount overdue becomes significantly large, some CPI firms ask the customer to sign a note for

the amount; the note to be reduced on a systematic basis. Often, the further stipulation is made that all future bills are to be maintained on a current basis.

Many CPI companies urge their customers to use commercial financing rather than hold off on their payments. But tight money isn't helping that effort. Recently, however, one large chemical company added a new twist — opening substantial accounts in small banks to put it into a position to "suggest" that loans might be made to some of the company's slow-paying customers.

Credit men seem as divided as ever on the merits of charging interest on overdue accounts and on using discounts to lure the receivables. Interest is a headache, say some credit men, "You just can't collect it; if you do, you lose the account."

Despite strong sentiment against charging interest, at least two major CPI companies are tagging their customers with a 6% penalty on all amounts past due. One of these firms previously charged 5%, but tight money has forced it to hike the rate in recent months.

Discounts, too, are not considered the solution by many credit men. Reason: high cost and abuse of terms. Discounts may prove expensive: some customers pay in 20 days but claim the 10-day price.

But, insist others, if the present slowdown in payments goes much further, discounts would pay for themselves by helping to bring in payments.

Outlook: Despite certain bright spots — many big companies are still paying promptly, and the petroleum companies are now receiving payments on some of '58's bad debts — the months ahead promise to hold trouble, say credit managers. Credit and sales people tell *CW* they see high interest rates and lagging payments continuing through '59, perhaps even getting worse. But most of them look for an improved financial climate in the industry in '60 — an election year.

Of course, further slowness in payments probably would be met by more intense collection efforts, by some inventory reductions and almost surely by a re-emphasis on sales based on product merits and service, rather than on price and credit terms.

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SALES

Budgeted Time Builds Bigger Sales

Increase your efficient selling time and your sales will increase. This apparently axiomatic piece of information was offered a few days ago by Schering Corp.'s marketing vice-president, Herman W. Leitzow, in a talk before the Seventh Annual Marketing Conference of the National Industrial Conference Board at New York. Leitzow was quick to smash any hint of oversimplification by pointing out that to increase efficient selling time, salesmen and sales managers have to team up in a drive on wasted effort.

"As I see it," Leitzow told an attentive audience, "most salesmen misuse time in one or two ways—either by 'saving' time foolishly or by wasting time carelessly. And one is as bad as the other."

In selling, he added, there are many situations in which there is only a "hairline between folly and fulfillment." Most often, the salesman alone can best decide where that line is, how much time and effort should be spent to reach a prospect. Supervisory management, however, must be ready to give constructive advice, control and support, Leitzow said.

Three "R's" of Control: To bring about effective and constructive control of field salesmen, Leitzow strongly advised NICB management members to follow the three "R's" of sales control:

- Relate your salesman's efforts to the account potential of his territory.
- Route your salesman in such a way that travel time is minimized.
- Reduce time spent in nonessentials by applying time and duty analysis methods.

In relating sales efforts to account potential at Schering, according to Leitzow, customers — physicians and commercial accounts — in each territory are ranked according to sales potential. For example, each physician is ranked according to the number of prescriptions he writes or influences, and each commercial account is ranked according to the number of prescriptions filled each day. "I don't need to tell you that any system of ranking is only as effective as the salesman's knowledge of his customers," the speaker warned.

"To make sure our salesmen have efficient, up-to-date routing, we insist

that they work from an itinerary that has been prepared by the salesmen themselves with the help of supervisors. Monthly, each salesman sends his division manager a route list based on the itinerary. In addition, the itinerary is reviewed periodically by the division manager and the salesman."

To determine how to reduce time spent in nonessentials, it's necessary to find out how the salesman spends his time, what selling methods he's using, Leitzow said. When you look into these factors you find that top salesmen spend as much as 50% more time per call in active promotional selling than the salesmen who lose significant amounts of time in non-essential activity. "You also learn that good salesmen control the interview, know how to turn apparent time disadvantages into time advantages."

The home office must bear part of the responsibility in helping the salesman budget his time wisely. "One way to do this is by controlling the amount of paper work sent to the salesmen. A recent McGraw-Hill survey found that 19% of the salesman's time was spent on paper work and sales meetings. Most of this paper work was reading," Leitzow said.

Specifically, Schering has helped solve its paper-work problem by reducing sales bulletins to capsule form, preparing a pocket-size bimonthly magazine, a newsletter and a digest of medical-paper abstracts. "Our representatives can carry these publications easily, can read them unobtrusively and quickly while waiting to see customers," Leitzow added that his company continually seeks ways to improve the sales report system—e.g., streamline report forms, make sure that the field information is meaningful.

He emphasized: "No matter what changes we will have to face in the years ahead, the salesman, his immediate supervisor and home office sales management will have to work continually at this problem of scheduling sales effort. As competition becomes more and more intense in regard to product line and price, the only way a salesman can increase sales is by increasing selling time, and the best way to increase selling time is to use total time more effectively."

Progress Report...

- UCON lubricants
- New di-tertiary amine
- Ethylene oxide

Three new functional fluids

Three new aliphatic diethers of polypropylene glycol are now being produced in commercial quantities by CARBIDE. These synthetic functional fluids are available in three viscosity grades, UCON lubricant DLB-62-E, UCON lubricant DLB-140-E and UCON lubricant DLB-200-E. All are miscible in hydrocarbon oils, and should be of particular interest to manufacturers of specialty lubricants, hydraulic fluids, greases, and gear oils. Other applications are indicated as heat transfer media fluids for use at extremely high pressures, and as inert solvents for processing operations.

Viscosity indexes of the new DLB series of UCON lubricants range from 160 to 190. They contain no wax or pour point depressants and have stable ASTM pour points from -50 to -85°F. In common with all UCON lubricants, the DLB series fluids have outstanding load-carrying capacity and anti-wear properties. The new lubricants form soluble fluids or volatile products, not sludge or varnish, and free carbon or coke is not formed in most high temperature uses. Thus, clean burnoff is assured in the presence of air with no gummy residues.

DLB series UCON lubricants are shear stable, do not hydrolyze in the presence of acid, neutral, or base solutions, and do not become rancid during storage. Properly inhibited, they show good oxidation resistance up to 500°F. Under ordinary conditions, the DLB fluids are non-corrosive to common metals, and have little or no effect on most rubber compounds.

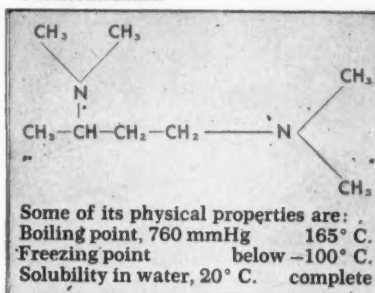
When suitably inhibited, these lubricants make high quality automatic transmission fluids. They may be blended with petroleum oils to improve low temperature performance and high temperature stability. The DLB series fluids have been utilized to formulate greases with improved viscosity-temperature characteristics. Because of their high load carrying capacity they can be used as the base for wide temperature range gear oils. They can also be employed as excellent hydraulic fluids in the range of -20 to 400°F.

CARBIDE's UCON lubricants, DLB series, are available now in tank car quantities, drums (carload or LCL lots), or in economical compartment tank car or truck shipments with other

CARBIDE products. A Technical representative in the CARBIDE office nearest you will be glad to furnish more details about these useful fluids. For a technical information bulletin, check the coupon on this page.

New chemical for you to explore

Its name is long, so we'll mention it only once: N,N,N',N'-tetramethyl-1,3-butanediamine.



This di-tertiary amine is a colorless, stable liquid, soluble in common organic solvents. It has proved to be a highly active amine catalyst for polyurethane foams, with fast curing rate, and low odor level, producing soft foams.

The new compound should be evaluated as a catalyst for epoxy resins. Its unique structure suggests applications in high energy fuels.

You can get this new chemical from CARBIDE in 55-gallon drums in LCL or carload lots. Technical Information Bulletin F-40392 contains data on physical and physiological properties. For a copy, please check the coupon.

Booklet gives tips on handling ethylene oxide

Processors who use or are considering the use of ethylene oxide will want a copy of CARBIDE's 20-page booklet on operating procedures for this workhorse of the chemical industry.

Ethylene oxide is the starting point for many glycol-ethers, esters, amines, and other derivatives. One of these derivatives, acrylonitrile, is an intermediate for certain elastomers, plastics, and synthetic fibers.

Fatty acids reacted with ethylene oxide produce polyoxyalkalene esters valuable as nonionic emulsifying

agents and detergents. The ethylene oxide adducts of alkylated phenols are important nonionic detergents and surface-active agents. Other applications for ethylene oxide are as fumigants, and sterilizing agents.

If you are working with this ever-useful chemical, make certain you get a copy of "Operating Procedures for Ethylene Oxide." In the booklet you will find recommendations for sampling, handling, unloading, and storing, plus ordering and shipping information. Please check the coupon.

Tear out this coupon. Check the boxes on which you'd like more information, and mail to Dept. HW, Union Carbide Chemicals Company, 30 East 42nd Street, New York 17, N. Y.

- ☐ UCON Lubricants Bulletin
- ☐ Bulletin F-40392
- ☐ "Operating Procedures for Ethylene Oxide"
- ☐ 1959 Physical Properties of Synthetic Organic Chemicals—a comprehensive description of the properties and applications of more than 400 CARBIDE chemicals.

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Doctor	Negative
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RESEARCH



Injecting malignant cell-free filtrate has evoked reaction that points up role of viruses in cancer.

Cancer Vaccine—Now a Matter of Time

A cancer vaccine is on the way—only its timetable is uncertain. That's the sentiment behind the newly intensified hunt for cancer-virus links, research that was highlighted last week by a report that a cell-free extract of human cancer has produced solid tumors in mice.

Previously, only animal-filtered tumor extracts have produced this response in animals. Now the evidence is strong, although still not proved, that there is a virus that causes human cancer, too. The virus must still be identified, grown and studied. Then it must be harnessed, either in killed or weakened form, to combat cancer.

This is the avowed objective of James Grace, Jr., chief cancer research surgeon at Roswell Park Memorial Institute (Buffalo, N.Y.) who, with colleagues J. A. DiPaolo, E. A. Mirand and J. R. Haas, authored the new report for the Clinical Congress of the American College of Surgeons

in convention at Atlantic City.

Grace is only one of an army of researchers with the same admittedly distant goal. At Roswell, for instance, his fellow workers, John Graham and Ruth Graham, have aided a "significant minority" of advanced cancer victims, using a tumor vaccine. Recently, they revealed that of 114 patients, most of whom had gynecologic cancer, 14 were free of the disease seven to 30 months after vaccination. Four types of vaccine were used, the best of which was a cellular suspension injected under the top skin layers as a water-in-oil emulsion. One complication: slow-healing ulceration at the site of injection.

Vaccinated patients responded better to subsequent radiotherapy, the Roswell team observed.

In animal tests, Sloan-Kettering Institute for Cancer Research (New York) has developed a vaccine that protects about 80% of mice against leukemia virus. Considering that the

first firm tie-in between cancer and virus in animals dates back to 1911, when the Rockefeller Institute's Peyton Rous induced sarcoma in chickens, progress even in animal cancer control appears vexingly slow.

Cancer's staggering complexity is one—perhaps the major—reason for the delay. There are more than 300 forms of the malignancy, indicating that a separate vaccine might be required for each one.

Even the Russians concede they are stymied, at least momentarily. According to Nikolai Blokhin, director of the Institute of Experimental and Clinical Oncology (Moscow), "virus-like bodies" have been found in tissue cultures made from fresh tumor specimens. However, Blokhin says, results so far are inconclusive.

Back to Basics: New hope for a vaccine is emerging from a widening pool of basic research. Earlier this year, the infectious components of animal viruses were isolated in pure

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By John J. Cooke, Secretary

Sworn to and subscribed before me this 10th day of September, 1959.

JANET A. HARTWICK

(Seal)

(My commission expires March 30, 1961)

RESEARCH

form for the first time and their infectivity was tested. Two scientists in the virus laboratory of the University of California (Berkeley) achieved this feat: Frederick Schaffer, associate research biochemist, and Carl Mattern, visiting research associate from the U.S. Public Health Services' National Institutes of Health. They isolated pure nucleic acid (which forms the "core" and contains the genetic activity) from a variety of viruses.

Current vaccines are based on the generation of antibodies, which attack the protein coat that normally surrounds and protects the nucleic acid core. Now there is speculation that there may be conditions under which the core may be vulnerable to direct attack.

This sort of work is also going on in industry. At Lederle Laboratories division (Pearl River, N.Y.), American Cyanamid, virologists are rounding out eight years of basic studies on the cancer riddle. One milestone: destruction of human cancer cells

under lab conditions with infectious bovine rhinotracheitis virus.

Chemicals, Too: Basic research has also steadily raised the stature of chemicals in treating cancer. Drugs are edging up on surgery and X rays in this field. Last fall, for example, the National Cancer Institute reported that for the first time in medical history, a drug (methotrexate) had caused suppression of a solid malignant human tumor. Lives of a small number of victims of the quickly fatal choriocarcinoma had been extended for as long as 30 months after treatment with the drug.

Even more dramatically effective compounds may be coming along, thanks to fundamental studies. One new theory has been proposed by Peter Kovacic, associate professor of chemistry at Case Institute of Technology (Cleveland). Kovacic believes cancer may originate under conditions where an abnormally high concentration of hydrogen peroxide is generated in the body cells. This



Cutting a Tooth on Tracer Techniques

Thai medical research teams in Bangkok are shown learning about the use of radioisotopes and radioactive tracers from an International Atomic Energy Agency expert. In this experiment, the snake is fed tagged compounds, subsequently is

milked for venom. Radioactivity of the venom is checked, provides clues to the poison's structure and snake's metabolism. The technique is also used in learning more about hormones. IAEA was asked for help by the Thai Atomic Energy Commission for Peace.

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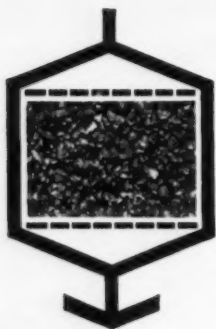
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RESEARCH



Roswell's Grace: Vital new cancer data is payoff on persistence.

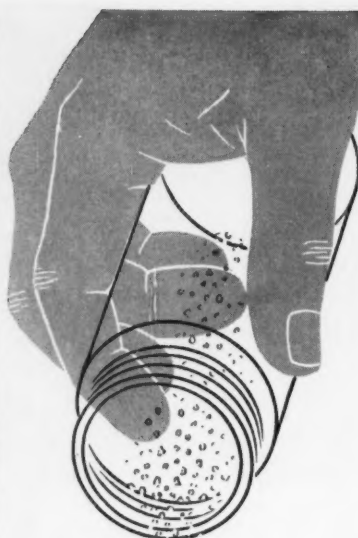
could happen if an agent inhibited the cell's catalase (the enzyme that normally destroys hydrogen peroxide). A number of carcinogens are known to inhibit this enzyme, he points out, and tumors generally contain only a low concentration of catalase.

Another approach is the so-called "fifth column" theory. Cancer cells often develop resistance to drugs, an ability fostered by production of an enzyme that breaks down the drug. One drug (a urethane) is used to spur enzyme production. A second (nitrogen mustard-urethane) follows, which is lethal to the cells in the presence of the enzyme.

Compounds Galore: Under new massive screening programs, mostly government-sponsored, thousands of compounds are getting a look as tumor-thwarters. Only four classes of compounds have appeared promising to date: purines, nitrogen mustards, uracils, and folic acid antagonists (pyrimidines).

Limited, though nonetheless tangible, success with drugs has been responsible for increasing international optimism about their role as anticancer weapons. Some recently reported compounds: tetraethylenciminoquinone (University of Freiburg, Germany); 1,6-di-(2-bromoethylamino)-1,6-dideoxy-D-mannitol dihydrobromide (Research Institute of Pharmaceutical Industry, Budapest, Hungary); and 5-bis-(2-chloroethyl)-aminouracil (Upjohn).

Nature's Remedy: In the cancer drug field, synthetics and antibiotics have had a lot of attention. Now hormones are capturing a bigger share



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Square Building, Hubbard 2-7160
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R. J. Clausen, 520 N. Michigan Ave.,
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Cleveland 13 H. J. Sweger, Duncan C.
Stephens, 1164 Illuminating Bldg., 55
Public Square, SUPERior 1-7000
Dallas 1 Gene Holland, Gordon Jones,
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Riverside 7-5117
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West Sixth St., HUntley 2-5450
New York 36 Knox Armstrong,
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Ave., OXFord 5-5959
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EXpress 1-1314
San Francisco 4 William C. Woolston,
68 Post St., DOUGlas 2-4600
St. Louis 8 R. J. Clausen, 3615
Olive St., CONTinental Bldg., JEFFerson
5-4867

RESEARCH

of cancer chemotherapy research. Errors in the body's hormone (steroid) production have been linked with a variety of diseases, including cancer.

E. R. Squibb & Sons, division of Olin Mathieson Chemical Corp. (New York), tells *CW* it is stepping up research in two major areas—research on the endocrine system, as it relates to cancer, and pilot-plant production and evaluation of steroid compounds on a larger scale than ever before. While the exact role of steroids in cell multiplication is not entirely known, there is evidence that they provide temporary growth-restraining action in these types of cancer: acute and chronic leukemia; Hodgkin's disease; lymphosarcoma; breast cancer and prostatic cancer.

Merck Sharp & Dohme is also closely involved in anticancer steroid research.

Cash Catalyst: Budgets for cancer research are climbing, along with hopes that the disease can be conquered. This year, the National Cancer Institute snared a record \$91-million appropriation from Congress. NCI has been footing about 80% of the nation's cancer research bill. Drug firms are similarly enthusiastic although there's not much profit in existing drugs. Cyanamid spent more than \$400,000 on cancer research in '58. Yet its sales of anticancer drugs (offered by Lederle) amounted to only \$29,000.

Despite the activity in cancer research, no one is making any promises. With luck and a lot more work, lab men feel cancer can be licked without a promise.

EXPANSION

• Paul-Lewis Laboratories, Inc. (Milwaukee, Wis.) has organized a new special products division under its expanded research department. The firm is broadening the line of enzymes it now manufactures for the dairy, food, fermentation industries.

• National Starch and Chemical Corp. (New York) is readying two new buildings at its Alexander Research Laboratories in Plainfield, N.J.

• Pumpmaker Fairbanks, Morse (Chicago) has opened a new research and development center at Beloit, Wis. The firm's R&D budget, \$1.5 million this year, will be raised to \$2.5 million in '60.

Tracers

TO THE
CHEMICAL
PROCESS
INDUSTRIES

Published: each Saturday—closes 11 days in advance.

Rate—\$3.00 per line (\$1.50 per line for position wanted ads), minimum 3 lines. Allow 5 average words as line; Count one half line for box number.

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POSITIONS VACANT

Plastics Salesman: Spencer Chemical Company seeks a man with enthusiasm, drive, and a desire for future progress in a plastics sales assignment. Preferably, we would like a man with technical education and approximately five years' industrial sales experience. This position offers an excellent opportunity for future advancement in an expanding organization. Please send complete resume of your experience, education, and salary requirements to: Personnel Manager, Spencer Chemical Company, 610 Dwight Bldg., Kansas City 5, Mo.

Retired C. E. Wanted, Manufacturer extending production to related lines desires services or technical guidance of Chemical Engineer having substantial experience in adhesives, synthetic resins, industrial chemicals. Write P-2717, Chemical Week.

Emulsion Polymerization Chemist—excellent opportunity with a progressive chemical company, Metropolitan New York area, for man thoroughly experienced in the formulation and production of homopolymer and copolymer of vinyl acetate and acrylates for use in the paint and adhesive fields. Salary open. Our employees know of this ad. Please write details of experience. P-2783, Chemical Week.

Chemical Writers & Editors, Unusual opportunities for experienced people in brochure writing on both promotional & technical literature. Must know organic chemistry. N. Y. City location. Miles Samuelson, Inc. 21 East 26 St., N.Y. MU 9-4554.

Industrial Editor: Chemical/Engineer background to develop a growing monthly. Under 30—willing to locate in upper Midwest. Resume to P-2782, Chemical Week.

SELLING OPPORTUNITIES AVAILABLE

Chemical jobber upstate Indiana, fine well-established line Industrial Chemicals, requires services experienced Industrial Chemical Salesman. Liberal salary commissions, expenses. Car furnished. Opportunity advancement. Chance to buy into company over the years. If experienced, send resume to SW-2628 Chemical Week. Our employees know of this advertisement.

Resin Salesman—New York, New England area. Expanding sales effort by growing chemical company offers excellent opportunity for experienced resin salesman to sell line of hard resins and pure phenolics to paint, ink and adhesive trade. Reply in confidence by sending complete resume and salary desired. SW-2653, Chemical Week.

SELLING OPPORTUNITY WANTED

Chemical Sales facilities Available—New York Area. A fast-growing chemical manufacturers' sales organization seeks one or two additional lines. We cover principally the dyestuffs, intermediates, pharmaceutical and general chemical fields. Current sales million dollars annually. We are a technically-staffed energetic sales organization; will devote reasonable amounts for sales development if exclusive representation of your line justifies same. Reply in confidence to RA-2803 Chemical Week.

MANAGEMENT SERVICES

Clark Microanalytical Laboratory—CH. N. S. Halogen, Fluorine, Oxygen, Alkoxyl, Alkylimide, Acetyl, Terminal Methyl, etc. by specialist in organic microchemical analysis. P.O. Box 17, Urbana, Ill., Empire 7-8406.

Wisser And Cox—Engineers-Geologists. Mineral raw materials from exploration to marketing. 55 New Montgomery-San Francisco, California. YUkon 2-1436. Cables: GEOLOG.

CONTRACT WORK WANTED

Air Milling—extremely fine particle size in the low micron range. Can handle heat sensitive materials. Experienced personnel-lab control. Storage and drop shipments arranged. Excellent transportation for domestic or export. Central Chemical Corporation, Processing Department, Box 310, Hagerstown, Maryland. REgent 3-4700.

Custom Grinding—Ultra Fine or Course-Specialty or Volume Blending and Grinding service on unit or contract basis. Complete CO₂ installation for Nylon, Teflon and Heat Sensitive Materials. A Cramer Corp., 10881 S. Central Avenue, Box 682 Oak Lawn, Illinois.

BUSINESS OPPORTUNITIES

Established Spanish agency seeks to represent metal and chemical firms interested in Spanish market. References. Communicate with Bridgeport Testing Laboratory, 14 Willow St., Bridgeport 10, Conn.

Wants To Buy Chemical Company. Well-rated Chemical firm interested in expansion and diversification wishes to acquire company established in Chemical Manufacturing, Distribution and Packaging of products including industrial and compressed gases. Preferably located Penna., N.J., Del., Md. All replies strictly confidential. BO-2795, Chemical Week.

FOR SALE

\$3,000,000 Liquidation—Chemical Plant at Orange, Texas. Type 316 Stainless Steel Tanks, Kettles, Heat Exchangers, Columns, Still, Crystallizers, Centrifugals, Pumps, Valves, etc. Wonderful Values. Send for list. Perry Equipment Corp., 1415 N. 6th St., Philadelphia 22, Pa.

For Sale: Unused Butlovak Single Drum Vacuum Dryer, 5' dia. x 12' long, in whse., never installed. Cost new over \$40,000. Will Sacrifice at \$15,000 FOB. FS-2533, Chemical Week.

Elliot 16" Water Strainer No. 44052, \$500.00. W. L. Broadus, Bx. 479. Phone GL 8-9844, Hope-well, Va.

1—Kennedy 7' x 9' continuous ball mill, integral herringbone gear drive, 150 HP. 1948—like new! Perry, 1415 N. 6th St., Phila. 22, Pa.

CHEMICALS WANTED

Surplus, Wanted—Chemicals, Pharmaceuticals, Oils, Acids Plasticizers, Resins, Dyes, Solvents Pigments Etc. Chemical Service Corporation, 96-02 Beaver Street, New York 5, N. Y. HANover 2-6970.

WANTED

Surplus and dead inventory wanted. We pay top dollar for unwanted chemicals and chemical products, waxes, spent catalysts, metal sludges, wasted solvents and gas cylinders. Industrial By-Products & Surplus Co., 40-40 Lawrence Street, Flushing 54, New York, INdependence 1-4100.

MISCELLANEOUS

To Employers Who Advertise for Men: The letters you receive in answer to your advertisements are submitted by each of the applicants with the hope of securing the position offered. When there are many applicants it frequently happens that the only letters acknowledged are those of promising candidates. (Others do not receive the slightest indication that their letters have even been received, much less given any consideration.) These men often become discouraged, will not respond to future advertisements and sometimes even question if they are bona fide. We can guarantee that Every Advertisement Printed is Duly Authorized. Now won't you help keep our readers interested in this advertising by acknowledging every application received, even if you only return the letters of unsuccessful applicants to them marked say, "Position filled, thank you." If you don't care to reveal your identity, mail them in plain envelopes. We suggest this in a spirit of helpful co-operation between employers and the men replying to Positions Vacant advertisements. Classified Advertising Division, McGraw-Hill Publishing Company. "Put Yourself in the Place of the Other Fellow."

Chemical

Week

BUSINESS BENCHMARKS

'59 OUTPUT INDEX

1958

'59 PRICE INDEX

1958

OCTOBER 10, 1959

WEEKLY BUSINESS INDICATORS

	<i>Latest Week</i>	<i>Preceding Week</i>	<i>Year Ago</i>
Chemical Week output index (1947-1949=100)	211.8	212.0	189.5
Chemical Week wholesale price index (1947=100)	110.9	110.9	110.5
Stock price index (12 firms, Standard & Poor's)	57.04	55.18	45.56
Steel ingot output (thousand tons)	365	362	1,901
Electric power (million kilowatt-hours)	12,878	12,779	12,342
Crude oil and condensate (daily av., thousand bbls.)	6,858	6,823	7,100

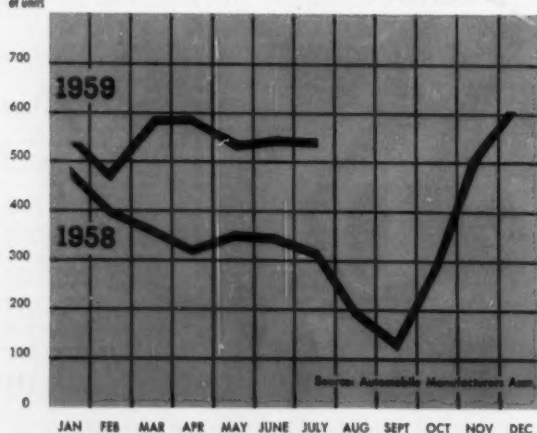
MONTHLY TRADE

(million dollars)

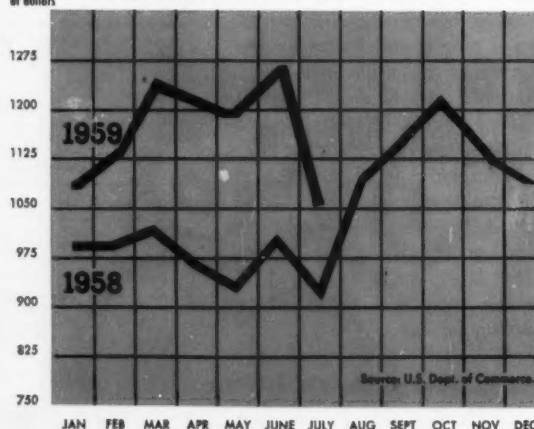
	Manufacturers' Sales			Manufacturers' Inventories		
	<i>Latest Month</i>	<i>Preceding Month</i>	<i>Year Ago</i>	<i>Latest Month</i>	<i>Preceding Month</i>	<i>Year Ago</i>
All manufacturing	\$30,812	\$31,248	\$26,284	\$52,228	\$52,138	\$49,777
Chemicals and allied products	2,156	2,125	1,979	3,830	3,768	3,722
Petroleum and coal products	3,108	3,095	2,806	3,343	3,366	3,314
Paper and allied products	1,040	1,042	937	1,483	1,492	1,413
Textile products	1,293	1,281	1,061	2,490	2,532	2,550

CHEMICAL CUSTOMERS CLOSE-UP

thousands of units
FACTORY SALES OF U.S. PASSENGER CARS



millions of dollars
MANUFACTURERS' SALES OF TEXTILES



airborne silica it's white magic!

**5-second
test proves
CAB-O-SIL®**

Try the 5-second test for yourself:

- 1) start with caky powder (it's sulfur here).
- 2) add just 0.5% Cab-o-sil by weight.
- 3) shake vigorously for 5 seconds.
- 4) voila! — you have a smooth, free-flowing powder!

What simpler way to prove for yourself the genuinely amazing conditioning effects possible with just a pinch of Cab-o-sil on caky powders? Cab-o-sil has already proved highly effective not only with sulfur, but with a wide variety of "problem" powders including urea and zinc oxide, insecticides, and rubber accelerators.

And here's a notable fact to remember: Cab-o-sil does the job in spectacularly minute amounts — as little as one quarter of one per cent by volume in some cases.

Anticaking is just one of a long list of immensely useful characteristics of this versatile raw material. Here are a few of the ways Cab-o-sil is currently being put to work:



We invite you to use the coupon below.
Minerals & Chemicals Div., CW **GODFREY L. CABOT, INC.,** 125 High Street, Boston 10, Mass.

USES:

- Thixotropic, thickening, gelling agent — lubricating oils, greases, polyester resins, epoxy resins, plastisols, plastigels, organosols
- Suspending agent — paints
- Flattening agent — varnishes, lacquers, organosols, plastisols
- Reinforcing agent — rubber, silicone, latex film
- Anticaking agent — sulfur, insecticides
- Antislip agent — solvent-base floor waxes
- Precoating material — reproduction paper
- Low temperature thermal insulation
- Pharmaceuticals and cosmetics — (See bulletin #cpa-1)

Please send ☐ free Cab-o-sil sample and other technical data checked

NAME

TITLE

COMPANY

ADDRESS

Technical data available:

- () General Properties, Functions and Uses (#cgen-1)
- () Cab-o-sil in the Rubber Industry (#crub-1)
- () Cab-o-sil in Butyl Rubber (#crub-2)
- () Cab-o-sil in Dipped Latex Films (#crub-3)
- () Cab-o-sil in the Lubricating Grease Industry (#cgre-2)
- () Aqueous Dispersions of Cab-o-sil (#cmis-2)
- () A Flattening Agent for Varnishes (#cpai-3)
- () Cab-o-sil in the Reproduction Paper Industry (#cpap-1)
- () Cab-o-sil in Polyester-Glass Reinforced Plastics (#cpla-1)
- () Cab-o-sil in the Plastics Industry (#cpla-2)
- () Cab-o-sil in Automobile Polishes (#cpol-1)
- () Cab-o-sil in Pharmaceuticals and Cosmetics (#cpa-1)

BAKER & ADAMSON® ANNOUNCES

RUGGED NEW FOAM-CUSHION CASE FOR C. P. NITRIC ACID



*Tough inner core of rigid plastic foam absorbs shock
... is acid resistant ... cushions bottles against breakage.*

For greater safety and convenience in the laboratory and warehouse, B&A C.P. Nitric Acid now comes in a special new high strength shock-absorbent case. Approved by ICC, this new "throw-away" case and its bottle separators are constructed of expanded polystyrene plastic sandwiched between sheets of tough fiberboard. This strong, rigid, lightweight foam material reinforces the case . . . reduces danger of breakage.

Lighter weight! Saves freight!

B&A's new no-deposit nitric case holds six 5-pint bottles, takes up less space and is lighter than the old fashioned

wirebound wooden case.

**No-deposit, no-return
5-pint bottle!**

C.P. Nitric Acid, like all B&A C.P. acids shipped in "throw-away" cases, is packed in 5-pint no-deposit, no-return bottles. Special 2-finger safety grip insures ease of handling . . . protects against slips and drops.

For information on availability in your area, phone or write your nearest B&A office.



BAKER & ADAMSON®
Reagent Chemicals



GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N.Y.

